Designing the Integrated Force: How to Define and Meet the Challenge?

5/8/17

By Dr. Robbin F. Laird

In this report, the major presentations and discussions at the Williams Foundation seminar on integrated force design held on April 11, 2017 in Canberra, Australia are highlighted along with interviews conducted before, during and after the seminar as well. Interviews with the Army, Navy, and Air Force have been woven into the evolving narrative of shaping and designing an integrated force.

Designing the Integrated Force: How to Define and Meet the Challenge?

BY DR. ROBBIN F. LAIRD

Second Line of Defense

THE SEMINAR APPROACH AND PROGRAM

The Williams Foundation has been a thought leader in bringing together the key players in the Australian military as well as allies to shape a way ahead for the integrated force.

The Foundation hosted a conference on April 11, 2017 in Canberra which explicitly addressed the key challenge of how to develop such an integrated force with a key case study being the way ahead to build an integrated missile defense capability built into the force.

Since March 2014, the Williams Foundation has conducted a series of Seminars that explored the opportunities and challenges afforded by the introduction of next generation combat capabilities.

Topics that have been explored prior to the latest seminar included:

- Air Combat Operations – 2025 and Beyond
- Battlespace Awareness – The Joint Edge
- Integrating Innovative Airpower (held in Copenhagen)
- Training for an Integrated ADF: Live, Virtual and Constructive Design-Led Innovation
- New Thinking on Air-Land
- New Thinking on Air-Sea

The hypotheses examined at the Force Design Seminar were as follows:

We must operate as an integrated team from the design, through delivery to the operation of the force; failure to act as such will incur unacceptable risk in future operations.

If we don't "design" the integrated force we are committed to "after-market" integration.

We can't build and operate an integrated force using business models developed for acquiring stand-alone, stove-piped capabilities.

"Design" is about more than just platforms and systems … it is about how we design, acquire, operate and sustain an integrated force in a more complex interconnected global context.

If we over-complicate the "design" process we will stall our efforts and get the same results we have had over the past 20 years; i.e. stove-piped capabilities.

We must recognise that the task load of the three Services in their raise, train, sustain and Capability Manager roles means that simply delivering a large volume of Force Design guidance to the three Services at once will not work; we must be cognizant of the realties of the Service's existing tasks and loadings when seeking to transform to an integrated force model.

In preparation for the Seminar, the Williams Foundation ran a six month IAMD Study, exploring the challenges of the IAMD program and the concept of integrated force design, as one example of the forty programs that the Department of Defence has embarked upon. The IAMD Study Report was launched at the seminar.

The seminar program for the day was as follows:

Seminar: Air/Sea/Land: Integrated Force 2030
11 April 2017 Program

Time	Topic	Name	Powerpoint
0830-0915	Registration		
0915-0920	Welcoming Remarks	AIRMSHL Geoff Brown AO (Retd) Sir Richard Williams Foundation	**Holding slide**
0920-0930	Seminar Intent	AVM John Blackburn AO (Retd) Sir Richard Williams Foundation	Yes Permission - Yes
0930-0950	The Integrated Force Imperative: Vice Chief of Defence Force (the Joint Force Authority) Perspective	VADM Ray Griggs AO, CSC, RAN Vice Chief of Defence Force	**Holding Slide** Permission – N/A
0950-1010	Achieving an Integrated Force by Design - Challenges and Opportunities	BRIG Jason Blain DSC, CSC Vice Chief of Defence Force Group	**Yes (sending 10 April)** Permission - TBA
1010-1030	Integrated Force Design - the Air Perspective	AIRCDRE Robert Chipman CSC Royal Australian Air Force	**TBA**
1030-1100	Break–Morning Tea		Sponsor Slide
1100-1120	Integrated Force Design - the Land Perspective	BRIG David Wainwright DSC Australian Army	**Yes (sending 10 April)** Permission - TBA
1120-1140	Integrated Force Design - the Sea Perspective	CDRE Philip Spedding DSC, AM RANR, Royal Australian Navy	**Yes - received** Permission - TBA
1140-1205	Panel Discussion	BRIG Blain, AIRCDRE Chipman, BRIG Wainwright, CDRE Spedding	**Holding slide**
1205-1210	Acquisition and Sustainment of the Integrated Force - Introduction	AIRMSHL Geoff Brown AO (Retd) Sir Richard Williams Foundation	**Holding slide**
1210-1230	Industry's view on Integrated Design	Mr Steve Froelich Lockheed Martin	**Yes – received** Permission - TBA
1230-1330	Break–Lunch		Sponsor Slide
1330-1350	Industry's view on Integrated Design	LTGEN (Retd) Jeff Remington Northrop Grumman	**Holding Slide** No Permission – N/A
1350-1410	Challenges and Opportunities in Acquisition and Sustainment of the Integrated Force	AIRCDRE Leon Phillips Capability Acquisition and Sustainment Group	**Yes – received** Permission - TBA
1410-1430	Challenges for CIOG in connecting the Integrated Environment	AVM Andrew Dowse AM Chief Information Officer Group	**Yes - received** Permission – TBA
1430-1450	Joint Capability Acquisition	RADM Tony Dalton AM, CSM RAN Capability Acquisition and Sustainment Group	**Yes (sending 10 April)** Permission - TBA
1450-1510	Break Afternoon Tea		Sponsor Slide
1510-1530	The Defence/Industry relationship and the Integrated Force	Mr Andy Watson MBDA Australia	**Yes - received** Permission - TBA
1530-1600	Panel Session	AVM Dowse, Mr Froelich, LTGEN Remington (Retd), AIRCDRE Phillips, Mr Watson, RADM Dalton	**Holding Slide**
1600-1630	Launch of the Williams IAMD Study --- Implications for the Integrated Force	AVM John Blackburn AO (Retd) Sir Richard Williams Foundation	**Yes – received**
1630-1640	Formal Close	AIRMSHL Geoff Brown AO (Retd) Sir Richard Williams Foundation	**Sponsor Slide**

Program current as of 28 Mar 2017

THE SEMINAR AND THE WAY AHEAD FOR THE INTEGRATED COMBAT FORCE

The program featured a number of the key officials involved in building the integrated force within the Department of Defence along with industrial stakeholders as well in the redirection of DoD design efforts.

The focus of the day was to have an honest set of presentations and debates about what was realistic, and what was not; what key drivers of change required more jointness, as well as the importance of domain competence as the force is reconfigured for more joint effect.

It was an unusual seminar in that were more questions than answers; but what was clear was that the notion of reshaping the force for greater joint effect was a vector of change and not simply implementing a set of abstract principles. But what did emerge was a fairly clear sense of the core realities and requirements needed to move to this next step – namely designing the force for greater joint effect.

The ADF is in the throes of significant modernization as new platforms are acquired and new approaches adopted. And the ADF is working to provide the extended defense of Australian territory, which by its very nature needs to see significant integration among, ground, air, maritime, space and cyber domains.

The legacy approach has been to acquire platforms and then to cobble together linkages among the platforms to create a "joint force." But this is simply after market linkages rather than thinking through how to integrate more effectively from the ground up as new platforms are acquired or legacy systems modernized.

The key shift being envisaged is to move from the project approach to a program and stream approach. The project approach is centered on platforms and linear acquisition within a fixed budget as the main trajectory. A program approach considers several projects in their interconnection to get the kind of effect one would want form synergy.

And the stream approach introduced in the first principles review is seen as a key element of how to more effectively bundle individual efforts into a more synergistic whole. In the first principles review, several streams or functions were identified to which platforms, and programs can be seen to contribute. But the goal is to get more strategic visibility with regard to new platform acquisition or legacy modernization in terms of trade offs, which provide best value for money or best capability from an asset.

The First Principles Review of Defence outlining ways to craft a more effective One Defence approach was released by the Minister of Defense April 2015. The key recommendations are laid out in the report but are summarized in the report as follows:

This review of Defence from first principles has shown that a holistic, fully integrated One Defence system is essential if Defence is to deliver on its mission in the most effective and efficient way.

In order to create One Defence and give effect to our first principles, we recommend Defence:

- *Establish a strong, strategic centre to strengthen accountability and top level decision-making*
- *Establish a single end-to-end capability development function within the Department to maximise the efficient, effective and professional delivery of military capability*
- *Fully implement an enterprise approach to the delivery of corporate and military enabling services to maximise their effectiveness and efficiency*
- *Ensure committed people with the right skills are in appropriate jobs to create the One Defence workforce*
- *Manage staff resources to deliver optimal use of funds and maximise efficiencies*
- *Commence implementation immediately with the changes required to deliver One Defence in place within two years*

What was in evidence at the seminar was the initial results of the review in terms of shaping within DoD a more integrated approach to the evolution of the 21st century combat force. It is obviously a work in progress, but you don't know what you don't know.

If you do not set of the objective of trying to optimize combat capability and consider that shaping the joint effect as a key means to doing so, then the challenge is clear: how to you get a strategic handle on where your force is moving to and how do you ensure that it is as effective, lethal and sustainable as possible?

The Need for a Strategic Approach

Notably, each of the Service Chiefs has put in place on the service level a very clear programmatic focus on developments in their domains with a growing regard to the joint effects. And these Service Chief commitments have been in evidence in earlier Williams Foundation Seminars as well. Put in other terms, the Service Chiefs are looking at the evolution of their capabilities from the perspective of how could they more effectively leverage other services and how might they more effectively support other services, dependent on the mission or tasks to be achieved.

Starting from that foundation, the next logical step is to try to gain a strategic handle on how the acquisition and modernization of assets can be more effectively conducted with regard to their synergy with assets within the joint force. And this effort is very synergistic in term with the evolution of the evolving warfighting operational approaches and the concepts of operations, which are being developed to reshape the framing, and execution of core tasks and missions.

There are a number of key factors or reasons why getting a better strategic grip on the evolution of the force from a joint perspective is essential.

First, given the shift in focus to high intensity operations the need to maximize one's combat effect compared to the adversary is essential. A connected force can provide an advantage but only if it is synergistic and survivable; otherwise it is vulnerable and can generate fratricide rather than destruction of the adversary's forces.

Second, the core enablers of combat power, such as C2 and ISR, are being dispersed throughout the services. Creating a tower of Babylon is not the outcome you want to have.

Third, a number of the new platforms being acquired are software upgradeable. It is desirable to be able to be able to manage tradeoffs among these platforms in terms of investments to get the best impact on the joint force. It is also the case that getting the kind of transient advantage one wants from the software enabling the combat force requires agility of the sort that will come with applications on top of middleware on top of an open architecture system.

Fourth, much of the force, which will be operating in 2030, is already here. This means that there will be considerable adaptation of the platforms towards greater joint effect. How to ensure that the legacy modernization programs provide effective joint effects, rather than simply stovepiped upgrades?

Fifth, the information and communication systems, which are the enablers for the joint force, are dynamic elements subject to market change and adversary disruptions. How to best develop IT and Coms packages which can support cross-cutting modernization and evolving force integration?

Sixth, to get the kind of cross cutting modernization one needs with an evolving 21st century force, how can the acquisition system be altered in order to provide for open-ended change? How to move from a platform linear project approach to a broader program approach which allows trade offs to be made with regard to platforms within a capability stream?

Seventh, the only way there will be the ongoing rapid transformation of the force will be shaping an effective industrial-military partnership whereby there is shared understanding and shared risk to achieve outcomes which are more targets than well defined platforms. How can this be achieved?

There are just some of the core questions, many of which were discussed during the seminar. But the core point is that raising questions, which drive you towards where the force needs to go, is the challenge; it is not about generating studies and briefing charts which provide visuals of what a connected force might look like. It is about creating the institutional structure whereby trust among the services and between government and industry is high enough that risks can be managed, but creative destruction of legacy approaches is open ended as well.

It is about empowering a network of 21st century warriors and let the learning cycle being generated by this network drive acquisition, modernization and operational concepts. It is about innovations within concepts of operations generated by the network to flow up into strategic change.

The danger to such an effort is the bureaucratic desire even necessity to constrain chaos and to constrain change. The focus can become on processes to the detriment of outcomes; the focus can become on shaping lightening bolts in charts showing how connected assets should be rather than allowing tasks forces and joint force packages to creative find ways to generate combat synergy.

It is also the case that the general can defeat the particulars. What is needed is the generation of real world case studies of generating joint effects from cross cutting modernizations and synergy, rather than mandating a set of principles, which would appear on the wall of various defense organizations. Guidance needs to be empowerment of the network; not providing detail lists of outcomes desired by the bureaucratic center.

The first principles review called for the creation of a strategic center; the danger is that it can become a center for process generation, and not the fostering of the kind of innovation which is required for shaping the joint effects need to prevail in 21st century warfare.

The Perspective of VADM Ray Griggs

The first major presentation at the seminar was appropriately that by VADM Ray Griggs, Vice Chief of the Defence Force. The VCDF Group was empowered by the defense reform process to spearhead the effort to build out the joint force.

According to the Australian DoD webpage:

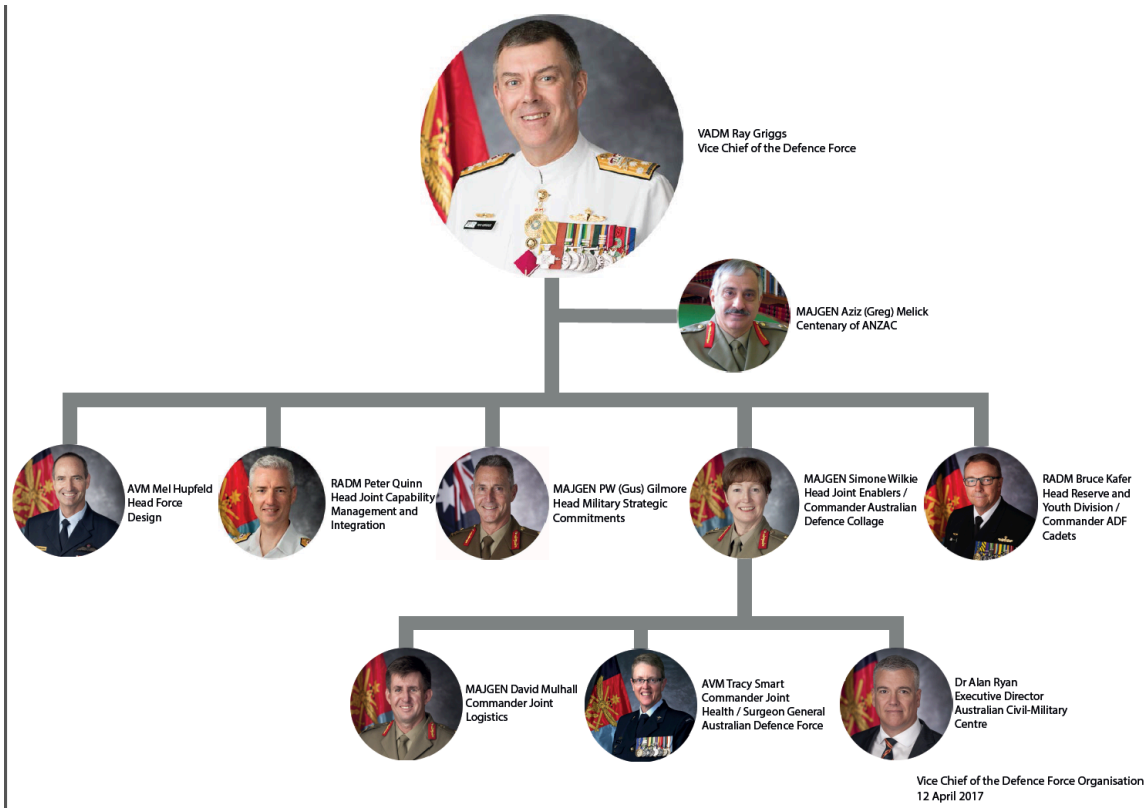
The VCDF Group enables Defence to meet its objectives through the provision of military strategic effects and commitments advice and planning, joint military professional education and training, logistics support, health support, ADF cadet and reserve policy, joint capability coordination, preparedness management, and joint and combined ADF doctrine.

Vision: The VCDF Group Vision is to be the Defence leader in the design of the Australian Defence Force structure and in the delivery of military enabling capabilities.

Mission: The VCDF Group Mission is to design and develop Defence Joint Capability and deliver military enablers in order to protect and advance Australia and its national interest.

http://www.defence.gov.au/vcdf/

The organizational chart below indicates his direct reports, and two of them are especially important to the focus of the seminar, namely the Force Design office headed by AVM Mel Hupfeld and the Joint Capability and Management and Integration Office headed by RADM Peter Quinn.



In his presentation to the seminar, VADM Griggs underscored that "we are seeing real changes in culture and behavior across defense." In part this is due to the fact that the warfighting domains are blending and becoming highly interactive with one another.

He argued that as we returned to a more congested and contested environment the five war fighting domains are becoming increasingly blurred. Effective integration then is critical to gain superiority in 21st century warfighting.

He argued for an integrated strategic direction but flexibility in shaping operating concepts. "We need central orchestration of the effort rather than a top down dictat."

He highlighted the need to shape a continuous capability review cycle within which to manage ongoing modernization, new acquisitions and effective management of trade offs in budget terms.

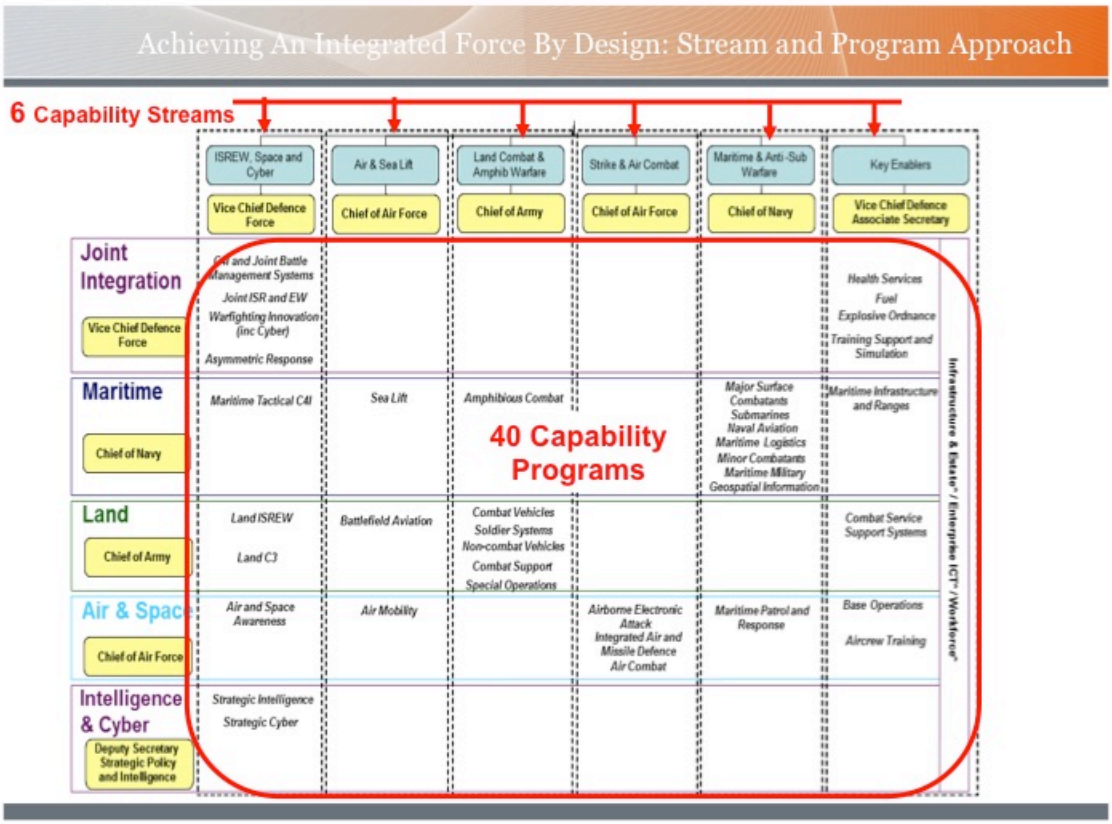
Second Line of Defense

He chairs the investment committee where the principals met to make strategic decisions on investments. Obviously, control of the purse strings is crucial to make suggestions turn into recommendations with clout for force structure development.

And finally he saw the streams as key elements to reshaping the strategic approach to force structure development – as modernization choices are made.

The Perspective of the Force Design Division

And indeed, in the next presentation by Brigadier Jason Blain, Director General Force Options and Plans from the Force Design Division, the importance of shifting to a stream and program approach was seen as fundamental to the shift to enable enhanced joint capabilities.



BG Blain highlighted throughout his presentation a number of key principles or guidelines to the thinking within the Force Design Division.

Integration is a force multiplier.

If we don't "design" the integrated force we are committed to "after-market" integration.

To enhance the ability to do integrated force design, the Division has developed a force design cycle whereby they evaluate opportunities to augment integrative efforts.

If we are not an integrated team from the design to the operation of the force, we will incur unacceptable risk in operations.

To get where Force Design Division wants to go with regard to integrated force design remains they need to engage in dialogue across the industrial and innovation ecosystem.

Design is about more than just platforms and systems…it is about how we design, acquire, operate and sustain an integrated force in a more complex interconnected context.

And to achieve such a design approach a number of key attributes need to be incorporated into the evolving approach:

- Force Design analysis of gaps and opportunities must consider the complete program design, including new integration challenges
- The Stream view will drive deeper understanding of how critical these challenges are to the warfighter in achieving joint effect sand reinforce the joint understanding of our gaps and opportunities.
- Force options must be developed with integration and interoperability as part of the up front design.

The Perspectives of the Services on Forging an Integrated Force

The next group of military presentations represented the services and provided a realistic sense of what the services wanted out of the joint design process. They provided a sense of the constraints within which joint force design could occur, and the outcomes desired by the various services with regard to the joint effect.

But again, the Service Chiefs have already redesigned the way ahead for each of these services built solidly on a joint perspective. What was in play in the presentations and discussions was not so much service stovepipes or focus on joint integration at the service level, but how best to leverage each service's core competencies and how those competencies could support or be supported by the joint force, dependent on the tasks or missions.

The Air Force perspective was provided by former Plan Jericho co-team lead, Air Commodore Chipman. In his remarks to the Williams Foundation seminar on force integration, he argued that integration, as a goal was laudable but not likely to happen as an abstract concept.

"I don't believe that we share a common understanding about integration across the ADF or with our international partners. We place too much emphasis on whole of system design, rather than prioritizing integration efforts."

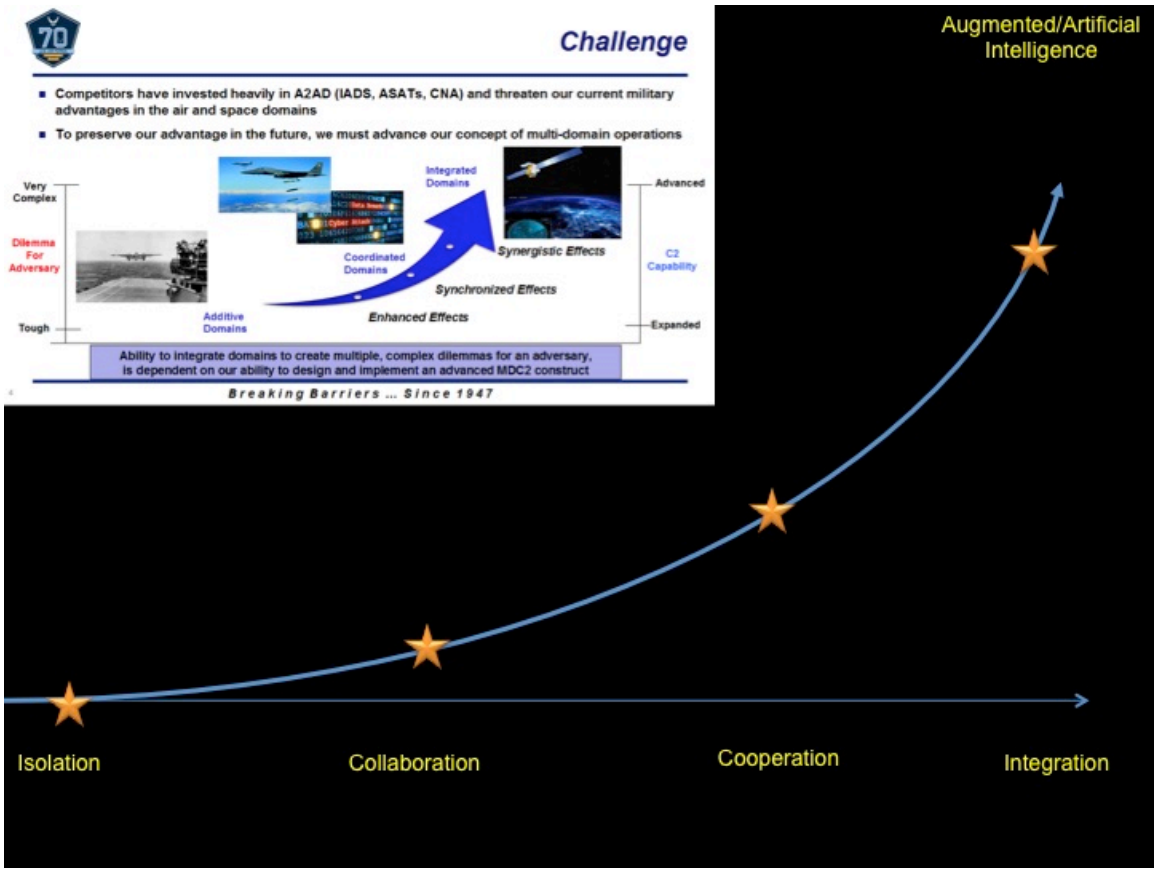
He argued that integration would progress with clear focus on clear and realistic priorities. And working organizationally to achieve core priorities would then open the pathway for accelerating real achievements with regard to decisive integration efforts.

Leveraging networks, leveraging sensors, and off boarding strike are key aspects of integrative behavior but sharing is not in and of itself integration. In many cases, collaboration is sufficient as the means to achieve the joint effect, rather than a whole of system design.

"We need to integrate sufficiently to take advantage of networked capability. That is why network taxonomy is so important in clarifying priority efforts to achieve greater capability to leverage networks and deliver a joint effect."

In the taxonomy, he highlighted that there are four levels of operational dynamics with regard to networks: isolation, collaboration, cooperation and integration. In effect, arguing the best could be the enemy of the good, Air Commodore Chipman argued that in many cases pursuit of collaboration or cooperation would

deliver the superior combat effect than to enforced integration, particularly if such efforts reduce the force to the lowest common denominator.



"And this effects prioritization. We want E-7 integrated with Air Warfare Destroyer and both able to cooperate with JSF. Which elements need to be tightly integrated versus generating cooperative effects for the ADF?

He argued for a pragmatic, flexible, and priority driven approach. "We need to generate thrusts forward in terms of greater combat effect. Integration is not a stationary target and after-market integration efforts will always be required to enhance collaborative and cooperative capabilities within the force. We need to have the flexibility to deliver aftermarket-integrated effects as a core activity as well as designing in integration from the outset where feasible. It depends on the priority for enhanced combat force performance."

Brigadier General David Wainwright, Director General of Land Warfare in the Australian Army, provided the Army approach. In his presentation and discussions at the Seminar, he highlighted the thinking of head of Army with regard to Army modernization with a core vector on the integrated force.

He quoted Lt General Angus Campbell's comments made last year to the Lowry Institute for International Policy. "The Army and more broadly the ADF needs to be able to influence and shape effects from and across multiple domains, as other protagonists will seek to do against us. This is why mastering 'joint operations' is even more important and much harder than ever before. We need to generate, coordinate and anticipate multiple cross-domain actions and reactions. No one service or domain can or will have a monopoly on success."

And then added the comment by Lt General Campbell made in the same presentation last year with regard to the nature of real world challenges and combat outcomes as a driving test of combat success. "Notwithstanding the proliferation of technology and the associated emergence of new domains, war without submission requires decision on land, where people live. The need for Orwellian 'rough men' (and women) is not going away anytime soon. War as a contest of wills, settled by close combat, and is the enduring responsibility of the Army. However, the context in which that contest takes place has and continues to change."

The focus of BG Wainwright's presentation was on the outcome of evolution of the jointly enabled and jointly contributing ground maneuver force.

"The Land Force Must be ready to fight into, through and beyond Complex Terrain – Here I will steal the Marine Corps definition of complex terrain; where the additional layers of informational and human complexity further complicate traditional geo-physical challenges."

"Future land forces will face unprecedented levels of complexity in cluttered, congested, hyper-connected and lethal future operating environments. Even the most benign mission may pose hidden challenges. This will require ready land forces capable of achieving tactical objectives in complex, possibly contaminated urban environments – in and amongst fragile populations; all while being challenged across multiple domains, simultaneously."

"The Land Force Must have the ability to form robust, lethal, and networked combined arms teams; fully integrated into the wider joint force and capable of operating dispersed or distributed, then to aggregate rapidly to deliver precise and discriminate effects. Not simply another insatiable consumer of information, fires and enabling support, or a stand-alone 'battlespace owner'… but a true joint player capable of delivering and integrating joint effects in partnership with, and as an important element of a larger inter-governmental, interagency and multinational team."

"Land forces must be survivable. Even the most seemingly benign operational contingencies can deteriorate rapidly and even the smallest commitment can require hard fighting, against well-equipped, determined and adaptive enemies. As much as we might wish for a future where long range sensors and stand-off fires mitigate the joint force need for land forces ready and prepared for the demands of sustained close combat in complex terrain – this represents wishful thinking, not sound force design."

"Moreover, the proliferation of next generation Air to Ground Missiles, explosive Unmanned systems, loiter munitions, advanced IED and mines, CRBN threats including everything from chemicals to thermobarics. And the consequences of efforts to disrupt our access to the Electro magnetic Spectrum and space borne enablers must be accounted for by a holistic approach to survivability and force protection."

"To achieve this will require the Integrated Joint Force to evolve from the best-equipped Army in our history, to the best-equipped land force, of its size, in the world."

The land force needed to be inherently joint given the evolving nature of warfighting domains. "Future land forces must be capable of potent cross-domain effects – projecting land power from the land into multiple domains, including the electromagnetic spectrum and the arena of human perception. This will undoubtedly create new challenges, demand new responses and require cultural change to see where land forces may best serve the interests of the joint interagency intergovernmental and multinational 'team of teams'."

Second Line of Defense

CDRE Spedding, RANR, DG Navy Program Support and Infrastructure provided the Navy perspective. His presentation like that of BG Wainwright focused on the kinds of outcomes which Navy needed to achieve both to leverage and to contribute to enhanced joint warfighting effects.

The Australian Navy has moved from a perspective of providing single naval assets to work alongside core allies, notably the US Navy, to providing task forces to meet government objectives. The focus upon building and operating task forces inherently requires integration at the task force level; and leveraging the task force to support government objectives inherently requires broader level of ADF and government integration within combat and political objectives.

The shift to a continuous shipbuilding strategy provides a significant foundation for how navy will address its modernization needs within a joint strategic framework. Naval platforms have both static and dynamic elements. The static elements will be grounded in fundamental ship design and maritime operating demand. The dynamic elements, combat systems and weapons, will be software driven and inherently open to integration with the joint force.

And the adoption of the Ship Zero concept provides an opportunity to provide a test bed for continuous development of the dynamic systems carried onboard maritime platforms.

In my interview with Chief of Navy last year, he discussed the Ship Zero concept as a foundational element in the way ahead for the Navy to provide for more rapid combat innovations.

Question: Wedgetail shows an interesting model, namely having the combat squadron next door to the Systems Program Office.

This facilitates a good working relationship and enhances software refresh as well.

You have something like this in mind for your ship building approach.

Could you discuss that approach?

Vice Admiral Barrett: "We do and are implementing it in our new Offshore Patrol Vessel program. And with our 'ship zero' concept we are looking to integrate the various elements of operations, upgrades, training and maintenance within a common centre and work flow to get greater readiness rates and to enhance an effective modernization process as well.

"We are reworking our relationship with industry because their effectiveness is a key part of the deterrence process. If I have six submarines alongside the wharf because I can't get them away, they are no longer lethal and they are no longer a deterrent force.

"Again, as an example we have dramatically improved availability by building maintenance towers alongside the submarine—rather than the previous way that it was done, where people arrived into that one gangway under the submarine then dispersed to do their maintenance work—is an example of how we need to work.

http://www.sldinfo.com/vice-admiral-barrett-on-the-way-ahead-of-the-australian-navy-design-the-force-for-decisive-and-distributed-lethality/

How do you fight with the force you have while you pursue development of a more integrated force?

The final three military presentations focused on the challenges of shaping a more integrated force fighting with the force you have while you are incorporating new platforms, software, communications systems and other key assets within the ADF.

How do you fight with the force you have while you pursue development of a more integrated force?

RADM Tony Dalton, Head of the Capability Acquisition and Sustainment Group, focused exactly on that question. "How does the legacy force come into play and affect new platform decisions? Before we can think about a future integrated force we have to make decisions now about force upgrades and modernization."

The shift, which needs to be made, is to ensure that upgrades and modernization of the legacy force are informed by options to shape a more effective force. "We have to work with the projects that are already in play and several of these simply do not point the way forward for a more fully integrated approach."

And if we are going to open the aperture with regard to more flexible development within the force, the challenge of how to manage cost is crucial. "If we buy an off the shelf system our schedule as well as costs are on a solid timeline. When we Australianize a system, costs will go up 12-15% and with it schedule slippage will occur. And if we are talking developmental systems we are looking at a 25-30% cost increase and with it schedule slippage as well."

The presentation by Air Commodore Leon Phillips, Director General Aerospace Maritime, Training and Surveillance, looked at ways to reshape the acquisition and sustainment of the integrated force to address some of the concerns raised by RADM Dalton. In this presentation, Phillips contrasted the traditional project approach with what he referred to as a new engagement model to allow for more flexibility in development but ways to constrain cost and shape realistic outcomes.

Put bluntly, without organizational change it would not be possible to achieve effective ways to shape integrated design cost effectively and in light of the dynamics of software development.

Traditional Contracting Approach

- CASG has traditionally used fixed or firm priced contracts to constrain costs and transfer clear delivery responsibilities to prime contractors.
    - Inappropriate where requirements are unclear
    - Costly if implementation is not studied
    - Ineffective if a large amount of interfacing with Government equipment/policy is required
- Industry engagement in the lead up to acquisition tends to be a written response to an established set of requirements

To achieve a joint design outcome, it would be necessary to shape an engagement model in which industry was a full partner. It was crucial as well to feed learning back into requirements generation as well.

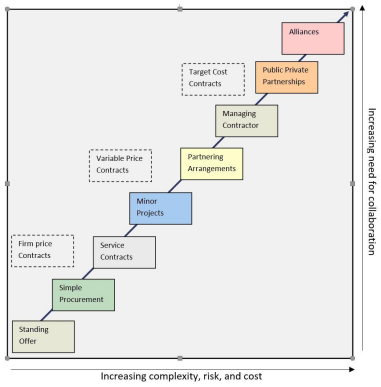
Budgeting changes were required as well. "We don't do enough funded work with industry to get a realistic assessment of the domain of the feasible nor with regard to how to price evolving options and capabilities. How do you price the evolution within the force of options and opportunities when you manage with fixed priced contracts? You don't."

He argued the new engagement model would divide programs into three phases: a partnership, appraisal and executive phase within which different approaches would be combined to deliver a capability.

Acqusition and Sustainment of the Integrated Force

Proposed Contracting Approach

- Use of Collaborative Contracting
  - Joint decision making
  - Target cost not fixed cost
  - Transparency and open book
  - Executive involvement of the capability sponsor
  - Dispute resolution framework
- Scope *and* cost certainty not locked down at project approval
- Cost as an Independent Variable (CAIV)



In the partnership phase, one establishes the steering group and the stakeholders to be involved in program definition. The focus is upon the vision or the wish list of the capability, which is the target of the effort.

In the appraisal phase, there are funded studies, which allow education about what is realistic to achieve for the target funding and to shape choice and determine how to reduce risk.

In the execution phase, the core decisions have been taken and the target objectives defined and pursued. The execution phase adjusts the vision to realistic outcomes within the targeted budget. It is not about requirements it is about outcomes driven by the partnership as a procurement force.

The final presentation addressed the challenges of the digital nature of the joint force: How to leverage IT and communication systems to deliver a force able to leverage a diversity of networks and to deliver a joint effect.

In his presentation, BG Wainwright defined how he saw this challenge: "The range, array and potential of next generation sensor technologies – matched to long range, precision fires – will demand low signature land forces capable of operating well below an adversary's detection and discrimination thresholds."

"Which leads me to offer a note of caution: A highly networked and integrated joint force is one that may on one hand draw great strengths, but equally exposes real and rich targetable vulnerabilities to our adversaries. It is here that the lessons of the past also hold the key to preparing for our future."

In Air Vice Marshal Andrew Dowse, Head of Information Communications Technology Operations, a diversity of challenges facing the development of a proper set of glues for evolving force integration was the focus of attention.

Second Line of Defense

One of the most interesting aspects of the discussion was the need to evolve the IT and Coms systems to support the ADF as its reach were expanded for the extended defense of Australia. This meant that reach, security and flexibility were crucial to ensure that platforms were not flying blind and their contributions minimized by lack of an ability to leverage various networks.

"The proliferation of networks proliferates the risks. And this could affect the availability and contribute of very expensive combat platforms at crucial points in combat operations."

Various networks is really the point. It is not about everyone being on the same network: it is about shaping ways for force packages to integrate by leveraging discrete, diverse and flexible networks.

"Mobility is a serious consideration; we need to provide digital capabilities where the force operates."

Williams Air/Sea/Land Integrated Force 2030

- Maintaining spectrum
- Making best use of spectrum
- SATCOM capability gaps
- Supporting mission flexibility
- Planning the integrated battlespace network
- How does that network support a 'Kill Web'?
- Contested environments - diversity and redundancy
- End to end services
- Matching integration effort with protection effort
- Decisive and timely defensive cyber decision making
- Developing mobility
- Dealing with fragility
- Understanding Defence priorities
- Managing obsolescence
- Increasing costs and reducing budgets

Shaping a Way Ahead – The Perspective of Air Vice Marshal (Retired) Blackburn

This seminar was different from the earlier Williams Seminars. In the earlier seminars, the new platforms on air, sea and land transformation was discussed in detail and the service perspectives highlighted. This seminar built upon these earlier presentations and then asked the question of how one would build by design more integration into such a force, rather than doing so after the fact.

John Blackburn provided a final perspective on the challenges and way ahead in designing an integrated force rather than cobbling together platforms into a force, which is, integrated piece meal after the fact.

Question: The seminar looked at a very tough issue. US services are individually looking at service integration, rather than force integration. The seminar explored how one might design in joint force

integration. Could you describe the approach used in the seminar, which might anticipate how this would be done in practice?

Blackburn: The hypotheses were put together as a set of questions to give a focus for the discussion, and each of the presenters were asked to do two things.

One was to talk about their particular area and how it's going to be a part of integrated force, but secondly, just test the hypotheses, or propose other ones if they thought they were better.

If we can agree a simple list of hypotheses, then we've got a really good starting point upon which to design the force. If we can't, we end up having an argument right down in the technical detail levels.

That was the intent.

The other different thing about this seminar was that I was able to meet with the three service representatives and the joint staff together to discuss what we were trying to achieve, what the hypotheses were, what the question sets were, and so the presentations you saw from the three services and from the VCDF here, were not people just coming into a seminar and giving their separate views.

They actually set down as a team and discussed it, to make sure the way they were looking at the problem and what they were going to present was coordinated, and to some degree integrated.

This normally doesn't happen at seminars. People get invited, and they all come up with a set of PowerPoint slides that usually their staff has produced for them, and they all give the standard story.

This didn't happen in this case.

Question: For sure, what you usually get is what Piaget referred to as parallel play?

Blackburn: That is right and we wanted here was serious consideration of how we might actually design an integrated joint force to get the full combat effects which force modernization could deliver.

In this case, we chose one stars to make the presentations.

Why did we do that?

When you get three stars, or senior officers, making presentations, everyone sits there and listens, but the folks who actually have to design the future force and lead the teams that are doing it are the one stars and the colonels, the O-6s.

You can see very strongly each of our service chiefs have a very strong future focus. Our Chief of Navy and the materials which he's been writing, our Chief of Air Force talking about the change in the whole way of culture we have to do this, and our Chief of Army driving his force forward.

When you've got 240 people in the audience, and these are by and large, apart from the industry folks, O-7s, one stars and below, they collectively are the ones that are going to have to do the hard work on doing the design under the guidance of the senior officers.

What we were trying to do for the 240 people in that room was have a conversation at peer level. In other words, it's peer-to-peer conversation. We as a team are going to have to address this.

That's why we decided not to ask the service chiefs to speak. At the conferences, we'll get the service chiefs, because they think it's important to have the head of the organization speak. We think it's important to have a

conversation amongst those levels in the organization that are actually doing the design and the thinking themselves, so they can express some ideas. They can exchange ideas.

It also is a really good way to set up networks, because not too many people are going to go ring up the chief of the service after a seminar and say, "Hey, I want to ask you about your question." It's not that hard to ring up one of the one stars who had a conversation and say, "Hey, I heard what you said."

There were some pretty important messages that came out from those one stars that showed they were thinking deeply about the issue and talking to each other about it. That's the way to get integrated force.

Question: When we're talking about a 21st-century integrated force and why that's important, a lot of people's minds go back to the network-centric warfare days, and that's not what we're talking about.

You clearly are not talking about connecting platforms after the fact and calling that integration.

How do you see the difference?

Blackburn: Let me go back to the difference between the two. I was head of strategic policy at the time and we worked with Admiral Cebrowski as he launched the NCW discussion. He told us “NCW is an idea which we are just getting out there. If 40% of what I'm saying ever comes true, that'll be a fantastic result, because it's an idea. It's to get the language out there."

The reality is, we're never going to be totally network-connected. It's not going to happen. It's like saying you're going to have unlimited bandwidth and everybody can actually connect without the adversary disrupting those networks. You've got to start with the idea. You've got to get people talking about it and to get the language out there into the debate.

Now where we're at now is moving to the next stage, of applying a bit of thrust as one of the speakers said, getting on with building this, not just talking about it but building it.

We see elements of force integration in the United States, but the integration there is by service. There's integrated force happening within Navy with NIFC-CA. The USAF is looking at their future, Aerospace 2034. We really have to follow the ideas in the U.S. but take one further step.

Because we're small, we might be able to take the step straight to JIFC, the Joint Integrated Fire Control idea for Australia. We want to learn from the U.S., follow it closely, but actually take a step which is hard for the U.S. to do because of its size, and that's go truly joint by design.

AVM (Retired) Blackburn led a study on integrated air and missile defense to explore the boundaries of how design from the outset of integration for the force might proceed.

The Williams Foundation conducted an Integrated Air and Missile Defence (IAMD) study between Sep16 and Feb17 to explore the challenges of building Australia’s IAMD capability and the implications for the Department of Defence’s integrated force design function.

The study was focused at the Program level of capability.

The study incorporated a visit to the US for a month to explore the IAMD challenge with United States Defense Forces and Agencies, think tanks and Industry. The initial study findings were then explored in Australia in three Defence and Industry workshops on 31 Jan17 and 1 Feb 17, using a Chatham House model of unattributed discussions.

Many of the statements made in this report are not referenced as they are derived from these Chatham House discussions and associated meetings.

IAMD is a highly complex issue; comments made in this report should not be construed in any way as being critical of the IAMD approach of the Department of Defence. This report cannot account for the full complexity of the integrated force design process that is being addressed within Defence; however, it may offer some value in providing suggestions based on the study findings.

This study would not have been possible without the support and assistance of several areas within the Australian Department of Defence, the US Defense Department, Industry and think tanks. The Williams Foundation deeply appreciates the support of the IAMD Study major sponsors, Lockheed Martin and Northrop Grumman. Thanks are also due to Jacobs in funding the services of Dr. Gary Waters who provided valuable support in the research for the study and in the production of the workshop notes.

This report represents the views of AVM Blackburn (Retd), the IAMD Study lead. This study report is intentionally high level and brief; in the author's experience, long and detailed reports are rarely read by senior decision makers.

The report can be downloaded here:

http://www.williamsfoundation.org.au/resources/Pictures/WF_IAMD_ReportFinal.pdf

RESHAPING THE INDUSTRIAL-GOVERNMENT WORKING RELATIONSHIP TO ENABLE INTEGRATED FORCE DESIGN

The Williams Foundation seminars on the crafting and empowering of an integrated force has focused largely on key elements for reshaping the force and enabling the capability to shape a more effective and integrated combat force. This will simply not occur without a significant reworking of the partnership with industry and the capability to bringing outside players in shaping innovation inside the process of defining, designing and building the force over time.

The process requires a much greater degree of openness to the inclusion of industry in shaping capabilities. In an article about Plan Jericho and the new approach towards industry, a way ahead was highlighted.

With the backing of RAAF leadership, the team decided to apply this new approach to the challenge of retrofitting the Hawk 127 Lead-in-fighter jet with the technology needed for it to operate under a new airspace management system in Australia. OneSKY requires all civilian and military aircraft to be fitted with an automatic dependent surveillance broadcast (ADS-B) system that digitally shares their precise location.

It will be significant investment in time and money to have ADS-B on all military aircraft.

But the Hawk 127 posed a problem. "There's very little real estate in which to put anything and the plane's original manufacturer told us the solution was going to be very costly and take considerable time to develop," Wing Commander Reid says.

"So we partnered with BAE Australia and invited all the aerospace sector players – some 20-odd players, including the primes such as Airbus, Lockheed Martin, Boeing, Raytheon as well as small Australian players such as Enigma Aviation – into the Design Innovation Research Center. There were over 40 people there from around the world, and we locked them in a room and said, 'Let's understand the complexities and then solve this problem."

Second Line of Defense

There was a lot of resistance initially as the DIRC team pushed the group outside their comfort zone of a traditional engineering approach, Professor Bucolo says.

"One of the really crucial things we did was we brought the stakeholders, the end users, into the room," says Wing Commander Reid. "We had an air traffic controller who told us about what it's like on a dark and stormy night, with zero visibility and a plane coming in with no ADS-B.

"We had a pilot who had a near-miss incident of less than 50 feet. He told us what went through his mind at that particular time – including his three young children.

"We had the Chief Engineer talk to us about the complexities involved in trying to fit this capability into an aircraft with little or no room to fit anything.

"Suddenly all of these tough engineers started to empathise and become design thinkers – and the solutions they came up with were just incredible."

On the last day of their week with the DIRC the group helped write the requirements for the Hawk 127 project – Wing Commander Reid says such early, comprehensive and open supplier involvement in the requirement definition phase of an acquisition is unheard of in Defence. The tender went out the following week, with 10 days to respond.

"We had 16 responses but, more importantly, four of the companies said they wouldn't respond because it was not for them and that we had saved them over $2 million in bid costs," he says.

On the face of it, this project was about building a 'thing' for an aircraft, he says. "But what I really care about is the shift in thinking that's happening."

The Hawk 127 was an example of design thinking applied to a specific problem, Professor Bucolo says, but design thinking is also being applied to big-picture strategy within the RAAF, showing the way for others.

Wing Commander Reid says defence forces around the world – like many businesses – realise that they can't sustain an advantage for long, that 'transient' advantage is the new normal.

"Our potential adversaries are moving at a pace that is unpredictable, with threats and capabilities increasing rapidly," he says.

"We develop a capability advantage, and it will last as long as we don't deploy it. As soon as we deploy it the advantage will be gone – which means we have to have the next capability advantage ready to go, and the next one and the next one.

"To do that we need a system of systems, not just one thing. We need speed and capacity. And design thinking is going to be at the forefront of that."

https://www.uts.edu.au/research-and-teaching/our-research/design-innovation-research-centre

The kind of partnership approach is crucial to any effort to effectively incorporate new technologies within an open-ended approach to program or stream development envisaged within joint force design efforts for the ADF.

At the Williams Foundation seminar on Joint Force Design, the kind of partnerships envisaged in shaping a new acquisition approach was described by Air Commodore Leon Phillips, Director General Aerospace Maritime, Training and Surveillance, looked at ways to reshape the acquisition and sustainment of the

integrated force to address some of the concerns raised by RADM Dalton. In this presentation, Phillips contrasted the traditional project approach with what he referred to as a new engagement model to allow for more flexibility in development but ways to constrain cost and shape realistic outcomes.

Put bluntly, without organizational change it would not be possible to achieve effective ways to shape integrated design cost effectively and in light of the dynamics of software development.

To achieve a joint design outcome, it would be necessary to shape an engagement model in which industry was a full partner. It was crucial as well to feed learning back into requirements generation as well.

Budgeting changes were required as well. "We don't do enough funded work with industry to get a realistic assessment of the domain of the feasible nor with regard to how to price evolving options and capabilities. How do you price the evolution within the force of options and opportunities when you manage with fixed priced contracts? You don't."

The industrial presentations made during the seminar highlights various aspects of the challenge in shaping a new working relationship with industry.

The core importance of shaping software approaches to provide for the kinds of transient advantage necessary to deal with a constantly evolving threat was discussed by Stephen Froelich, Director, Operational Command and Control, Lockheed Martin Rotary and Mission Systems. In his presentation, Froelich highlighted the importance of open systems architecture, and agile development through software evolution to gain transient advantage. He argued for the importance of a business model that supports an open, agile and spiral development approach. This requires the simultaneous management of current capability, hardware and fielded capability.

Lockheed is involved in the new submarine program as the combat systems designer and clearly will be involved along with a number of companies teamed with it in providing Navy with the kind of transient advantage necessary for the maritime arm of the ADF.

When I interviewed Chief of Navy prior to the seminar we discussed the new submarine as a case study of the continuous shipbuilding approach which is essential not just to the Navy but to joint force enablement.

Question: One aspect of change clearly is building 21st century defense structure.

I have just returned from the UK and witnessed their significant efforts at Lossiemouth, Waddington, Marham and at Lakenheath to have a new infrastructure built.

And certainly have seen that at RAAF Williamtown with the F-35 and at RAAF Edinburgh with the P-8/Triton.

How important in your view is building a new infrastructure to support a 21st century combat force?

Vice Admiral Tim Barrett: Crucial.

And that is in part what I am referring to as an industrial and national set of commitments to shaping a 21st century combat fleet.

We spoke last time about the Ship Zero concept.

This is how we are focusing upon shaping a 21st century support structure for the combat fleet.

I want the Systems Program Office, the Group that manages the ship, as well as the contracted services to work together on site.
Second Line of Defense

I want the trainers there, as well; so that when we're maintaining one part of the system at sea, it's the same people in the same building maintaining those things that will allow us to make future decisions about obsolescence or training requirements, or to just manage today's fleet.

I want these people sitting next to each other and learning together.

It's a mindset.

It puts as much more effort into infrastructure design as it does into combat readiness, which is about numbers today.

You want to shape infrastructure that is all about availability of assets you need for mission success, and not just readiness in a numerical sense.

Getting the right infrastructure to generate fleet innovation on a sustained basis is what is crucial for mission success.

And when I speak of a continuous build process this is what I mean.

We will build new frigates in a new yard but it is not a fire and forget missile.

We need a sustained enterprise that will innovate through the life of those frigates operating in an integrated ADF force.

That is what I am looking for us to shape going forward.

There were two other industrial presentations at the seminar as well.

The first was by Lt. General (Retired Jeff Remington of Northrop Grumman and provided him with an opportunity to highlight the challenges to building the joint force seen from an American perspective. He highlighted how the service specific architectures placed barriers in terms of shaping a more general approach to the integrated force.

And as the key enabler of several Australian systems, Wedgetail and Triton, clearly Northrop is a key player in shaping the way ahead for an evolving integrated force for Australian defense, which is interoperable with its closest allies as well.

The Wedgetail case illustrates the path of how the ADF actually got onto the path of working beyond a narrowly requirements dominated approach and taught the ADF and MoD more generally the importance of shaping a new approach. Boeing is the prime contractor, but Northrop provides the key radar system around which Wedgetail is built.

The Chairman of the Williams Foundation, Air Chief Marshal (Retired) Brown described the learning curve with regard to Wedgetail and whereby the RAAF got the new capabilities.

Question: As Chief you decided to push your new aircraft – Wedgetail and the KC-30A – out to the force rather than waiting for the long list of tests to be complete.

Why?

Air Marshal (Retired) Brown: Testers can only do so much.

Once an aircraft is functional you need to get in the hand of the operators, pilots, crews and maintainers. They will determine what they think the real priorities for the evolution of the aircraft, rather than a test engineer or pilot.

And you get the benefit of a superior platform from day one.

When I became Deputy Chief of Air Force, the Wedgetail was being slowed down by the Kabuki effort to arrange specification lines for the aircraft. There was much hand wringing amongst the program staff as to how it didn't meet the specifications that we had put out.

I said, "Let's just give it to the operators."

And the advantage of basically giving the aircraft to the operators was what the test community and the engineers thought were real limitations the operators did not. Sometimes it took the operators two days to figure a work around.

And the real advantage of the development was that they would prioritize what was really needed to be fixed from the operational point of view, not the testing point of view.

In other words, you can spend a lot of time trying to get back to the original specifications.

But when you actually give it to the operators they actually figure out what's important or what isn't important and then use the aircraft in real world operations.

And what this has meant is a new working relationship between operators and industry to deliver ongoing modernization of the platform.

This approach was highlighted during an interview with Group Captain Bellingham published last year.

Question: It is clearly a system in progress with the capability to evolve into what the US CNO calls a key capability to operate in the electromagnetic battlespace, and to do so for the joint force.

Could you talk about the joint evolution?

Group Captain Bellingham: "Army and navy officers are part of the Wedgetail crew... We are not just extension of what the air defense ground environment or the control reporting units do from the ground. We take our platform airborne and we do air battle space management.

"Recently, in the Army led Hamel exercise, we pushed the link picture down to the ground force headquarters. Their situational awareness became significant, compared to what they have had before.

"And since the Williams seminar on Air-Land integration, several senior Army officers have been to Williamtown to take onboard what we can do and potential evolution of the systems onboard the aircraft.

"We are seeing similar developments on the Navy side. A key example is working with the LHD. My opinion is that the Wedgetail will be critical to making all the bits of an amphibious task group come together. And not just that but as the P-8 joins the force, we can broaden the support to Navy as well. And the new air warfare destroyer will use its systems as well to pass the data around to everyone, and making sure everyone's connected.

"The E-7 is a critical node in working force integration and making sure we're all seeing the same thing at the same time, and not running into each other, and getting each other space. We're not on a ten second scan. We are bringing the information to the war fighter or to whoever needs it right then."

Second Line of Defense

Question: During the visit, we have been in the squadron building, the hangar and in the System Program Office collocated with the squadron.

What advantages does that bring?

Group Captain Bellingham: "It facilitates a close working relationship between the combat force and the system developers.

"We can share our combat experiences with the RAAF-industry team in the SPO and to shape a concrete way ahead in terms of development.

"The team is very proactive in working collaboratively to get to the outcome we're looking for."

Finally, Andy Watson from MBDA missile systems focused on the evolving relationship between industry and government, which has generated by the Team Complex Weapons approach of the British government.

According to MBDA:

Team Complex Weapons (Team CW) defines an approach to delivering the UK's Complex Weapons (CW) requirements in an affordable manner.

This value for money proposition also ensures a viable industrial capacity. The PMA aims to transform the way in which CW business is conducted by MoD with its main supplier.

At the heart of this is a joint approach to the delivery of the required capability based on an open exchange of information and flexibility in the means of delivery.

http://www.mbda-systems.com/about-us/mission-strategy/team-complex-weapons/

A recent example of the fruits of this approach was latest agreement reached between MBDA and the UK government.

According to the British government:

Secretary of State, Sir Michael Fallon, has today (April 21, 2017) announced three new missile contracts worth a combined £539 million for state-of-the-art Meteor, Common Anti-air Modular Missile (CAMM) and Sea Viper missile systems at MBDA Stevenage.

The deal ensures our Armed Forces have the best equipment available to protect the new Queen Elizabeth Class Carriers and the extended fleet from current and future threats.

The half a billion-pound contracts will sustain over 130 jobs with MBDA in the UK, with missile modification and service support being carried out in Stevenage, Henlow, Bristol and Bolton.

Secretary of State, Sir Michael Fallon, said:

"This substantial investment in missile systems is vital in protecting our ships and planes from the most complex global threats as our Armed Forces keep the UK safe.

"Backed by our rising Defence budget, these contracts will sustain high skilled jobs across the UK and demonstrate that strong defence and a strong economy go hand in hand..."

Meanwhile, a £175 million in-service support contract for the anti-air Sea Viper weapon system will ensure that the Royal Navy's Type 45 Destroyers can continue to provide unparalleled protection from air attack to the

extended fleet. Under the contract, the missiles will be maintained, repaired and overhauled as and when required to ensure continued capability.

The Sea Viper missile defends ships against multiple threats, including missiles and fighter aircraft.

The final contract is a £323 million deal to purchase the next batch of cutting-edge air defence missiles for the British Army and Royal Navy, offering increased capability at a lower cost. Designed and manufactured by MBDA UK at sites in Bolton, Stevenage and Henlow, the next-generation CAMM missile will provide the Armed Forces with missiles for use on sea and on land. CAMM has the capability to defend against anti-ship cruise missiles, aircraft and other highly sophisticated threats.

Signalling our continued investment in Type 26 programme, CAMM will provide the anti-air defence capability on the new Type 26 Frigates for the Royal Navy and will also form part of the Sea Ceptor weapon system on the Type 23 Frigate and will also enhance the British Army's Ground Based Air Defence capability by replacing the in-service Rapier system.

Tony Douglas, Chief Executive Officer of Defence Equipment and Support, the MOD's procurement organisation, said:

"Work on these cutting-edge missiles, which will help to protect the UK at home and abroad and secure jobs across the country, demonstrates the importance of Defence investment. That is why, working closely with our industry partners, we continue to drive innovation and value into everything we do; securing next generation equipment for our Armed Forces at the best possible value for the taxpayer."

Dave Armstrong, Managing Director of MBDA UK, added:

"MBDA is delighted by the continued trust placed in us by the Ministry of Defence and the British military.

"The contracts announced today for Meteor, CAMM and Sea Viper will help protect all three UK Armed Services, providing them with new cutting-edge capabilities and ensuring their current systems remain relevant for the future.

"They will also help to secure hundreds of high-skilled people at MBDA UK and in the UK supply chain, maintaining the UK's manufacturing base and providing us with a platform for exports."

In short, reshaping Government's approach to working with government and expanding the portfolio of partnering arrangements is essential to generating the intellectual capital, property rights, and innovations necessary to deliver a dynamic integrated combat force.

New approaches to shaping outcomes from the acquisition engagement process are crucial in order to empower successful partnering arrangements.

In my interview with Chris Jenkins, head of Thales Australia, and National President of the Australian Industry Group, he provided broad insights with regard to the challenge of reshaping the Government-Industry partnership.

Question: I spent time with the head of Air Force this morning, Air Marshal Davies, and he is keen on shaping an integrated force. It is not just about platforms, but finding ways to deliver integrated capabilities.

What is the challenge and impact on industry of such an approach?

Second Line of Defense

Chris Jenkins: This clearly means that government needs to work with industry as interactive sector, and not just put industry at a distance. The position emerging from government is that "We want industry and defense to work very collaboratively, constructively together."

There are very clear actions being taken to support that by the service chiefs and by the people in the Capability Acquisition and Sustainment Group, you're actually seeing industry gaining confidence that industry should be working more collaboratively together, forming the team sets that can deliver not only platform but also systems. Companies are starting to work together to share workload because of the complementarity of those skill sets that one company might have compared to another.

You're starting to see companies working more constructively together to create teamings that can better deliver the whole ownership system, or the whole of a vehicle system, or the whole of an air capability and to thereby develop and keep key skill sets in key sectors.

Time will tell but industry is responding to the opportunity to engage in a collaborative set of partnerships between defense and industry.

Prior to these government initiatives, Australia has been one of the lower end performers on collaborative development. Reshaping this relationship is crucial to get the kind of success Australia wants with shaping integrated forces.

Question: Clearly, this means that even when platforms are bought abroad, there needs to be a working relationship where that platform evolves over time within an ADF context, not simply replicating whatever has been done to modernize the platform in the originator's home market.

How will Australia do that?

Chris Jenkins: There's a smart buyer approach in the market now, which is looking for the elements that will go onto the key platforms that are specifically focused on the Australian defense requirement. Rather than buying a complete platform and system from overseas off the shelf, is I think the realization is Australia does have some unique operational requirements, and so building into the procurement process a way of evaluating how best to bring those teams together that can meet those requirements through the life of the vehicle, or the ship or whatever it might be, is being done more sensibly.

The customer is helping shape that market or the way the market responds to the requirements more effectively. I think that is a fundamental change.

How well projects deliver as a consequence of that overall change, again time will tell, but I think all signs are actually quite positive. The first principles review made strong recommendations, and it looks like, to me at least, that the actions that need to underpin those recommendations are being taken.

INTEGRATED FORCE DESIGN: THE SERVICE PERSPECTIVES

During the week of the seminar, there was a chance to discuss the way ahead with shaping the integrated force with the Force Design Office, Chief of the RAAF, Chief of the RAN, and two senior Army officers responsible for Army modernization and development.

As mentioned earlier, the Service Chiefs are clearly committed to more effective joint operations, but must ensure that as they add new capabilities that their domain competencies remain viable and able to both contribute to the joint effect and to draw upon other services to deliver a joint effect,

Focusing on the Joint Effect: Air Marshal Leo Davies and the Way Ahead for the RAAF

During my visit to Australia in April 2017, I had a chance to meet and talk again with Air Marshal Leo Davies, Chief of Staff of the Royal Australian Air Force.

During the Avalon Air Show, the RAAF released its long-term strategy document, Air Force Strategy: 2017-2027.

When the document was released, Air Marshal Davies highlighted how central he saw the evolving joint context to defense modernization.

"Of the five vectors (of strategic development discussed in the strategy document), CAF said the capabilities which would require the most work and fundamental cultural changes were joint warfighting and people.

"I don't believe we, as an Air Force, understand how joint we need to be. We have come a long way – we talk a lot about joint, but I am not sure we are culturally able to shift from doing Air Force stuff first.

"I would like the Air Force in a joint context to begin to put the joint effect before our own Air Force requirements."

This perspective was highlighted by Air Vice-Marshal (Retired) John Blackburn as a key element for shaping the next phase of development for the Australian Defense Force, namely, shaping a joint force by design, rather than pursuing an a la carte connection after the fact effort.

"Cultural change, as reflected in CAF's strategic plan narrative, is required to prioritize the integrated force outcomes over the individual force priorities where appropriate."

We started the interview by discussing precisely the cultural change aspect of transitioning to a fifth generation warfare approach.

Air Marshal Davies: "When aircraft first arrived at the battlefield in the very early days of World War I, having just begun to learn how to fly in fact, it was the, "But it'll scare the horses" type mindset from the cavalry in particular which limited thinking.

"But it didn't take long even for the cavalry to work out that this thing could really make a change in warfighting.

"It was not the particular airplane, not what model you flew, but the advent of air power as an option for the battlefield became the, "Wow! How do we get more of that?"

"Fifth generation is as dramatic as that.

Second Line of Defense

"We are trying to at least be prepared for and begin to understand that it is real is 5th generation methodology.

"It is as big a step as it was at the advent of air power in World War I.

"But we are not, in my view, the best at taking such big steps.

"We tend to fail to see that there is a step to be taken, and keeping doing what we have done well in the past.

"But more importantly, we revert to a Maslow type hierarchy. "Can I touch it? Can I see it? Can I be part of it? Does it fulfill me both in a technological sense, but as importantly, in a mental and emotional sense?"

"Because as an Air Force we recognize that we need to take a major step forward, we are confronting what it will be mean to have a fifth generation operating model, rather than just acquiring a new airplane.

"It is challenging, but you can't meet the challenge if you do not recognize the strategic opportunity.

"We put in motion "Plan Jericho" precisely to shake up thinking and to get on with crafting the journey of becoming a fifth generation air force.

"We have to learn that there is a new way of doing business, and if we didn't show some clear recognizable, understandable, and air force-involved steps along the way, it would've always been just a little bit too far.

"We're demonstrating that it is possible by the rethink associated with Plan Jericho.

"We have acted under the assumption that Plan Jericho is a compass not a roadmap.

"The new strategy focuses on the five vectors of change and if we follow those vectors and implement the changes we can succeed in becoming a fifth generation air force and a powerful asset for the ADF in terms of enhanced joint effects."

Question: It is clear that the challenge is not so much to connect a force via a network to become integrated as it is about training, shaping and empowering a 21st century network of 21st century warfighters.

And from taking to many of your key officers responsible for introducing or operating the new platforms, it is clear that they get the point it is not about simply operating a new platform, it is about becoming an integrated fifth generation combat force.

How do you best support this transformation?

Air Marshal Davies: "A key benefit from the Plan Jericho approach is reshaping the language.

"It is not about how does this new platform fit into the force as it is, it is about how does this new platform enable the force to fight the way we need to be able to in the future?

"It has to be realistic but in a sense the reality we are looking at is not just the Air Force as it has fought in the past and present, but the Air Force as it vectors towards the future fight.

"If you don't do this you will be only discussing and debating platforms in the historical combat space.

"And when we come to new platform decisions, we are positioning ourselves to ask the right question of the services: How does a particular platform fit how we will need to fight in 10 year's time? Is the Navy or the Army or the Air Force entitled to that particular capability choice if it doesn't fit that criteria?"

How to fight with the Fleet you have today and Prepare for the Fleet of the Future? The Perspective of Vice Admiral Tim Barrett

During my most recent trip to Australia, the focus was upon how to shape an integrated ADF moving forward. During my interviews surrounding the Williams Foundation seminar on that theme, I have the chance to talk to key decision makers in shaping a way ahead.

Last August, I had a chance to talk with the Chief of the Australian Navy, Vice Admiral Tim Barrett.

A key speaker at the Williams Foundation seminar on air-land integration was the Chief of the Australian Navy, Vice Admiral Tim Barrett.

Barrett's speech focused on the opportunities and challenges of the largest recapitalisation of the Australian Navy since World War II.

New submarines, destroyers and amphibious ships and associated fleet assets are being built in Australia to shape a new maritime capability for Australia.

But this force is being built in the time of significant innovation in the Pacific whereby new force concepts are being shaped, such as kill webs, distributed lethality, and fifth generation airpower.

Barrett made it very clear that what was crucial for the Navy was to design from the ground up any new ships to be core participants in the force transformation process underway.

http://www.sldinfo.com/vice-admiral-barrett-on-the-way-ahead-of-the-australian-navy-design-the-force-for-decisive-and-distributed-lethality/

We picked up where we left off from our August meeting.

Question: How do fight with the fleet you have and prepare at the same time for tomorrow's fleet, especially when you have several new programs in the pipeline?

Vice Admiral Tim Barrett: You have to fight with the fleet you have now. That is not an option; it is a necessity.

My focus to do that better and to lay the groundwork for the future fleet is to focus upon availability of assets. How to we get our availability rates higher? How do we get ships to sea more effectively and more often?

They are not going to make much difference sitting in dry-docks.

One can provide for enhanced deterrence through enhanced availability.

Question: You certainly don't win with Power Point slides, do you?

Vice Admiral Tim Barrett: You certainly don't nor with a connected force in those slides, represented by lightening bolts but not realized in practice.

For example, we have a small submarine fleet of six submarines; they are not going deter anybody if they are not available and capable of going to see. As we discussed last time, we have put a major effort in

getting much greater availability from our Collins class submarines, and the ways we have done so will shape our approach, our expectations and our template for the operation of the new class of submarines. We have seen a dramatic improvement in our Collins Class boats.

Question: In other words, by learning how to ramp up availability with today's fleet you are preparing the template for future operations?

Vice Admiral Tim Barrett: That is clearly our approach going forward. We should be building our sense of availability in the design right now, so that when the future frigates arrive in place, we have maximized availability, and through that deterrence given their contribution to a distributed lethal force capability.

And this clearly is a key challenge for the workforce to shape enhanced availability. We are reworking our work force to do so today, but must prepare for the transition in the workforce to do so in the future, recognizing that tomorrow's platforms will be different, and different skill sets required ensuring enhanced availability.

Government has committed to a future navy in terms of key new platforms. I have that as a target goal so can work from here to there rather than simply fighting for the need to have a future fleet. This certainty is crucial in allowing me to work the transition.

As we shape task force concepts for the current fleet, we are working connectors to make the fleet more effective in our task force approach. As we work those connectors we are also anticipating how to build those into the design of the new fleet, rather than having to work the problem after we have acquired the platforms.

Question: And this is not simply about Navy, you focus is broader?

Vice Admiral Tim Barrett: It is; it is about working with industry; it is about working with the ADF; it is about working with government; in essence it is about the commitment of the nation.

We are a small force; smaller than the New South Wales Police Force. We cannot do this without a national commitment.

Question: One aspect of change clearly is building 21st century defense structure. I have just returned from the UK and witnessed their significant efforts at Lossiemouth, Waddington, Marham and at Lakenheath to have a new infrastructure built. And certainly have seen that at RAAF Williamtown with the F-35 and at RAAF Edinburgh with the P-8/Triton.

How important in your view is building a new infrastructure to support a 21st century combat force?

Vice Admiral Tim Barrett: Crucial. And that is in part what I am referring to as an industrial and national set of commitments to shaping a 21st century combat fleet.

We spoke last time about the Ship Zero concept. This is how we are focusing upon shaping a 21st century support structure for the combat fleet.

I want the Systems Program Office, the Group that manages the ship, as well as the contracted services to work together on site.

I want the trainers there, as well; so that when we're maintaining one part of the system at sea, it's the same people in the same building maintaining those things that will allow us to make future decisions about

obsolescence or training requirements, or to just manage today's fleet. I want these people sitting next to each other and learning together.

It's a mindset. It puts as much more effort into infrastructure design as it does into combat readiness, which is about numbers today. You want to shape infrastructure that is all about availability of assets you need for mission success, and not just readiness in a numerical sense.

Getting the right infrastructure to generate fleet innovation on a sustained basis is what is crucial for mission success.

And when I speak of a continuous build process this is what I mean. We will build new frigates in a new yard but it is not a fire and forget missile. We need a sustained enterprise that will innovate through the life of those frigates operating in an integrated ADF force.

That is what I am looking for us to shape going forward.

Question: An example of your approach to the future is clearly the new submarine. A French design house and an American combat systems company will be working together really for the first time. And they are building a submarine, which has never been built before.

This provides an opportunity for you to shape a new support structure along the lines you have described going forward.

How do you see this process?

Vice Admiral Tim Barrett: It is something new and allows us to shape the outcome we want in terms of an upgradeable sustainable submarine with high availability rates built in. We intend to see this built that way from the ground up.

It is not simply about acquiring a platform.

We will not be a recipient of someone else's design and thought. This will be something that we do, and we will work with those that have a capacity to deliver what we say we need.

I think the way you characterize the process makes sense. The experiences we've had through Collins have taught us a lot. With 12 of these future submarines in a theater anti-submarine role we think we can make an effective contribution to our defense and to working with core allies in the region, notably the US Navy.

Ed Timperlake recently commented on this book as follows:

The Aussies are not just buying new equipment; they are rethinking how to integrated that force and make a more effective and lethal combat capability.

A recent publication by the Australian Chief of Navy illustrates the point.

Australia's Vice Admiral Tim Barrett has written a brilliant book about maritime power.

It is what is known as a "good read" because it is written with great insights presented in easily understandable prose.

He shows the reader why "The Navy and the Nation" is a sacred bond.

Second Line of Defense

This passage is one of the most powerful ever written about the role of a Navy and the connection with their citizens:

"Most People think the Navy is something else.

"They know it exists, the may even have a rough idea of what it is for, but they don't think it's got much to do with them.

"They're wrong.

"The Navy is a national enterprise in which everyone is involved and which everyone is involved and which delivers peace and security to everyone in the country.

"This enterprise is a two-way street, and must be a two-way street.

"Going one way, the Navy offers peace and security. Going the other, the people offer support and contribution. Only when the street is a properly mutual two-way exchange between the Navy and the citizens can this bargain, this contract, deliver what it needs to."

http://www.sldinfo.com/remembering-the-battle-of-the-coral-sea-and-building-towards-the-future/

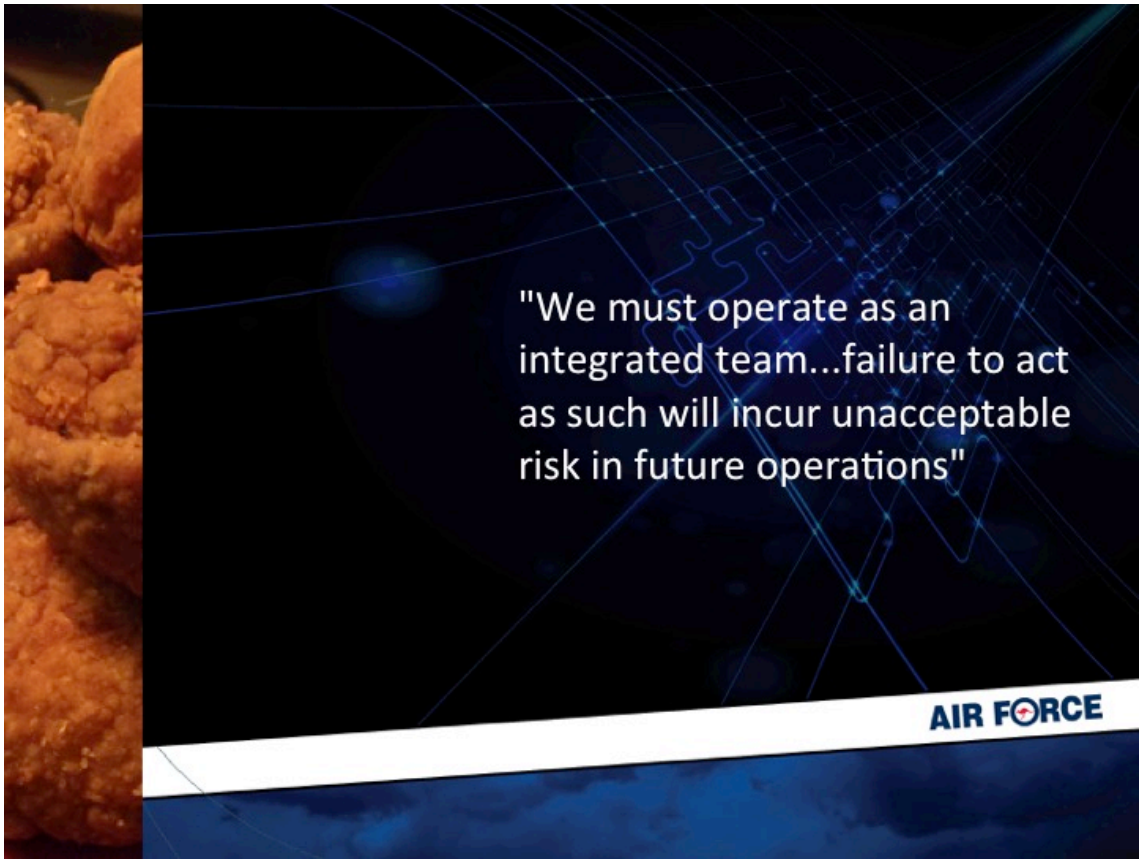
The Challenge of Shaping Future Capabilities Informing the Evolving Force: The Perspective of Air Commodore Chipman

I first met Air Commodore Chipman when he was leading the initial Plan Jericho movement. He now has become Director General of Capability Planning in the RAAF and is now faced with the challenge of infusing the forward thinking represented by Plan Jericho into actual capabilities. And doing so clearly is about shaping the evolving force into a more integrated direction.

http://www.sldinfo.com/the-co-directors-of-plan-jericho-group-captain-rob-chipman-and-group-captain-jake-campbell-discuss-the-way-ahead-for-the-raaf/

Plan Jericho is a compass not a road map; but now is working the challenge of shaping programs to move down the direction where the compass is providing some guidance.

And it is clearly not easy. Notably, with the RAAF introducing new platforms across the board, weaving those into a comprehensive capability, let alone an integrated one, is very challenging.



In his remarks to the Williams Foundation seminar on force integration, he underscored the importance of generating key thrusts within force development that allow movement in the right direction.

In my interview with him, he underscored that one of the problems is clearly ensuring platforms stay on track, such as the F-35 transition effort, which is under his office's responsibility. His office also has responsibility for the missile defense program discussed at Williams.

He highlighted that the challenge of generating a future direction comes into conflict with program management.

"The biggest danger, is that as things crop up, and one particular project has a crisis, a financial crisis or something that jeopardizes what government has approved you to achieve, then you get focused in on solving that problem at the expense of thinking more broadly about our strategic direction."

At the heart of it he saw the approach that needs to be put in place is a community of 21st century operators who have a shared perspective on shaping joint effects as the strategic direction. Effective joint force design is essential, but it won't deliver an effective joint force in the absence of greater collaboration in the operational community.

He saw the Air Warfare Centre and its service counterparts as a key locus where shaping such a community of thinking and interest in shaping a way ahead for building a joint force.

Second Line of Defense

"I don't own the Air Warfare Center, but I think what I can do is start to influence the goals that we set for the Air Warfare Center so that we start to drive the kind of collaboration we need to integrate Air Force, and the Australian Defence Force."

And clearly there needs to be practical cases or thrusts within program development which can provide the push necessary for greater program design for integration.

"We need to have broad enough of a perspective so that we can drive programs towards joint outcomes. For example, it will be crucial to bring E-7, with F-35 and air warfare destroyers into a common decision making space so that we can realize built in capabilities for integrated air and missile defense."

"And that needs to be informed by shaping a common perspective with the USN and USAF as well. Let's take integrated air missile defense as an example, because the project part of that at the moment within Air Force is Air 6500, a project that I'm responsible for.

"We've received strategic guidance that we should be interoperable with the U.S. in their Pacific theater. We need to put a little bit more definition to that. What is our vision for a theater air missile defense system between Australia and the U.S.? We need to integrate our platforms with a clear view of how to maximize our working relationship with the USN and USAF as a key driver for change as well."

He emphasized the need in effect for practical steps forward at the tactical levels as key drivers for change as well. "The force is clearly innovating tactically and we need that innovation to be informing ways to reshape integrated capabilities going forward."

The RAAF is looking at a new UAV to add to the force, and the Air Commodore saw that as best done by shaping and leveraging the creation of the ISR hub at RAAF Edinburgh. And any new UAV should emerge from the integrated P-8/Triton efforts from that hub.

"Our new platforms need to plug into a common organization that is thinking broadly about the mission rather than simply buying a new UAV and handing it to the common organization. Platform acquisition in future clearly will need to be informed by integrative innovations and the 21st century network of warfighters, as you put it."

And the RAAF needs to find ways to prepare and promote disruptive change. In part that will be done by shaping a community, which has confidence in its ability to promote change and work towards a joint effect from any acquisitions going forward.

"Predicting the future accurately is hard. What we need is to develop confidence in our ability to adapt quickly as the future changes and evolves in front of us and to be able to respond to those changes. It is about creating organizational capacity and confidence to be able to respond to an evolving future."

The Jericho project team is now working on ways for the RAAF to understand and anticipate disruptive change. They are focusing on a concept called disruptive thinking. We are working with the private sector and with academia to find pockets of excellence able to come up with new ideas and new ways of using fielded technology to help with defense's mission."

He articulated where he would like the RAAF to be able to position itself in the future.

"I would love to see Air Force become earlier adopters of technology. I think at the moment we wait until technology is too mature before we bring it into service.

"We live in a region where competitors are clearly innovating rapidly.

"If we're able to bring ourselves forward on that technology acceptance curve, I believe that would be a really good outcome for us."

The Point of the Joint Effect: A More Lethal and Survivable Force

The discussion of something like integrated force design can seem to be abstract and metaphysical and more of a seminar topic than an actual strategic effort by the ADF.

But it is not.

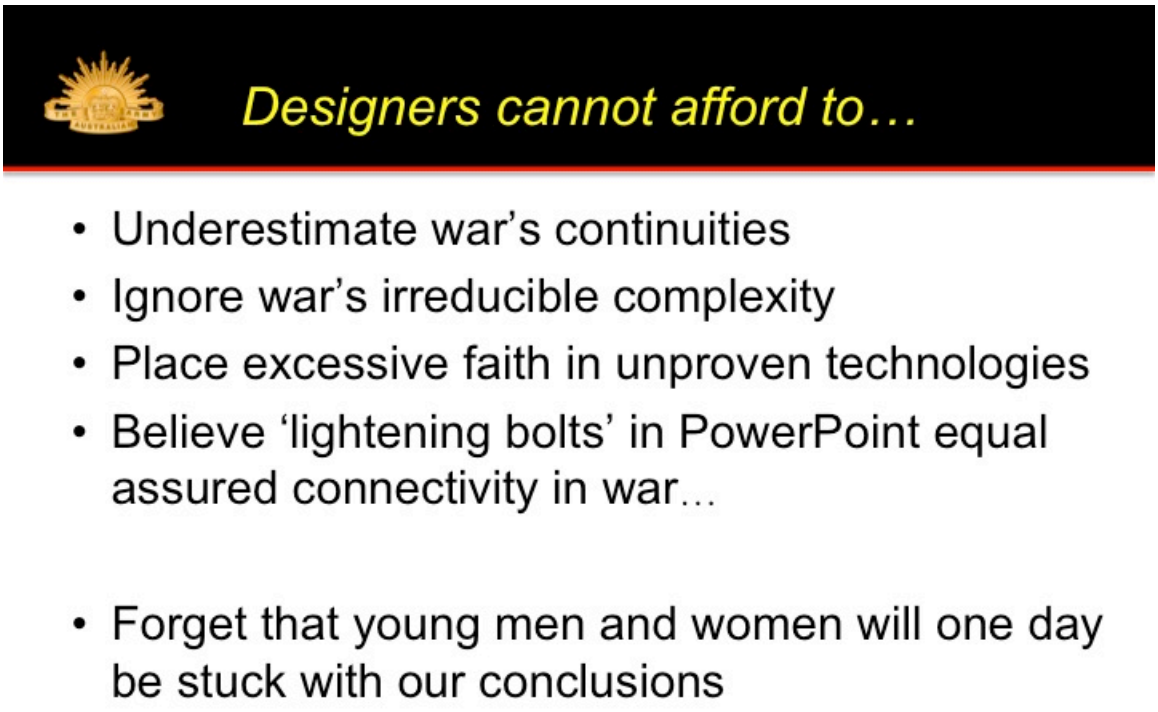
It is about ensuring that your warfighters are more lethal and survivable.

One is working to reduce fratricide, and a more capable and comprehensive use of combat resources at the point of attack.

At the Williams Foundation Seminar held on April 11, 2017, no presenter more effectively drove home the point than Brigadier General David Wainwright. He is Director General of Land Warfare in the Australian Army.

In his concluding slide he provided a series of caveats on force design and brought the audience back to the core point: "We can not forget that our young men and women will one day be stuck with our conclusions."

Second Line of Defense



In an interview held later in that week at his office, it was clear why he focused so strongly on this point. His own combat experiences in the Middle East and elsewhere underscored that getting your concept of operations right was crucial to combat success. In particular, his experience in Afghanistan, which required evolving the concept of operations, was directly correlated with combat success. Having the right approach and the right command structure was an inherent part of success or failure.

This means for the future land force, that shaping an effective concept of operations as part of an integrated joint force was not a word game, or a bureaucratic game, but fundamental to the combat success of the ADF.

As BG Wainwright put it during the interview: "Joint effect through integration by action is crucial. We need to frame any design the future force to achieve greater joint integrated effects respectfully across all warfighting domains. For me the key to this challenge rests in our people. Moreover I see that the younger generation is a critical component to this design, because they are pretty well joint educated, enabled and experienced. The question is how can we maximize the future force to be built around those instincts and experiences?"

And the kind of joint effect he was focused upon was not only the ability to share common resources but to funnel those resources in terms of the kinds of decisions, which had to be made in the different warfighting domains.

"I don't want a joint ISR program being developed in isolation at the operational level without a clear understanding of the ground force considerations. It's dangerous for this to even be conceived as a notion. ."

He emphasized that the changing strategic environment was driving the need to reconsider some of our traditional models as we strive to design a capable responsive and empowered effective future integrated force.

"In the past decades, we have in many ways predominately fought wars of choice. Arguably, this luxury of choice will not necessarily continue. Increasingly, we see a higher probability of facing the possibility of wars of necessity and National Interests at threat. Moreover, the force must be response to new challenges that are not simple to define."

"From the impact of exploding urbanization, severe demographic shifts, population growth and resource scarcity; to the barely glimpsed consequences of hyper connectivity and climate change. The way warfare will manifest in the future, the adversaries we may face and the means we will employ are impossible to fully prepare for."

"The land Force component will continue to play a vital role in response to these challenges. As such Australia must continue to invest in a highly capable ground force integrated into the joint force. We need to get this design right; as failure to adequately prepare the force is not an option."

"The fluid nature of the 21st century battlespace means as well that operations in one domain need to be informed by and to inform the other warfighting domains. In effect, either you integrate or get in each other's ways with very negative perhaps even disastrous effects. In other words, joint warfighting is necessary not just to enhance combat effectiveness but to avoid the kind of entropy which conflicting elements of a network force could create by cross-cutting each other in quite a literal sense."

He argued that with the new technologies, more combat power could be concentrated on smaller combat units. And C2 combined with empowering the way we will fight needs to be pushed to those units enabling them to be more lethal and survivable.

"There can be little doubt that technology is changing the character of the contemporary military problem, suggesting not simply technological solutions but the need for innovative operational concepts across all the domains – simultaneously. The force designers of today must navigate this complexity to provide tomorrow's policy makers and joint task force commander's robust, capable and responsive options for a tomorrow of contested domains, increased lethality and irreducible complexity."

"And it is crucial as well to train for the future with significant uncertainty as a training framework. Training with networks and without; training with GPS enabled systems and without; these are important training venues to ensure the kind of combat flexibility and skill sets which the Australian Army would need to exercise in 21st combat situations."

He had a healthy disregard for our capabilities to actually know in detail future war situations and conditions and argued for shaping solders to fight with confidence in uncertain combat situations. In effect, he was arguing that the design of the integrated force needed to built around training of the soldiers, sailors and air men to be able to deal with disruptive change and combat learning on the fly in very dynamic combat situations.

His core sense of joint force design from the Army's perspective was to deliver a set of outcomes for the ground maneuver forces. These key outcomes were summarized in the following slide:

Obviously, this is a very challenging set of outcomes to achieve. But without setting out these targets, the point of joint force design would simply be lost and become a PowerPoint bureaucratic exercise.

And for this senior officer, force design is not a word game; it is about ensuring the safety, survival and combat effectiveness of the Australian Defence Force. And without integrated force design these objectives will be sub-optimized. Put bluntly, if you do not design a force with joint effect as a key objective, you are putting your people at unnecessary risk and you will not train your people for success in the evolving 21st century context of combat operations.

Australian Army Modernization: An Update from Brigadier General Mills

During my recent visit to Australia to attend the Williams Foundation seminar on integrated force design, I had a chance to discuss Army modernization with the head of the effort, Brigadier General Chris Mills. This is the third time I have had the opportunity to interview Mills, and during this interview, he provided an update on how the Australian government was approaching defense modernization and the evolving Army perspective.

http://www.sldinfo.com/an-update-on-air-sea-land-integration-for-the-adf-the-perspective-of-brigadier-general-mills/

http://www.sldinfo.com/the-australian-army-modernizes-for-the-21st-century-battlespace-an-interview-with-brigadier-general-chris-mills-australian-army/

At the heart of the Australian Army modernization effort is ensuring enhanced lethality and survivability for the modular force packages being shaped by a 21st century approach to force development and integration.

The objective of Army modernization is to empower smaller army units and ensure their modular integration into larger force packages, as and when required. Army modernization is focused on evolving and

developing capabilities, which provide for agility, flexibility and integration. And to do so, Army is relying on joint capabilities, whether ISR, fires or C2. But it must also ensure that its ground maneuver elements have sufficient organic combat power to operate on their own as well.

In one of the earlier interviews, this is how BG Mills put it.

Question: In some ways, what you are describing is taking the mental furniture of the Special Forces and applying more broadly to the Army?

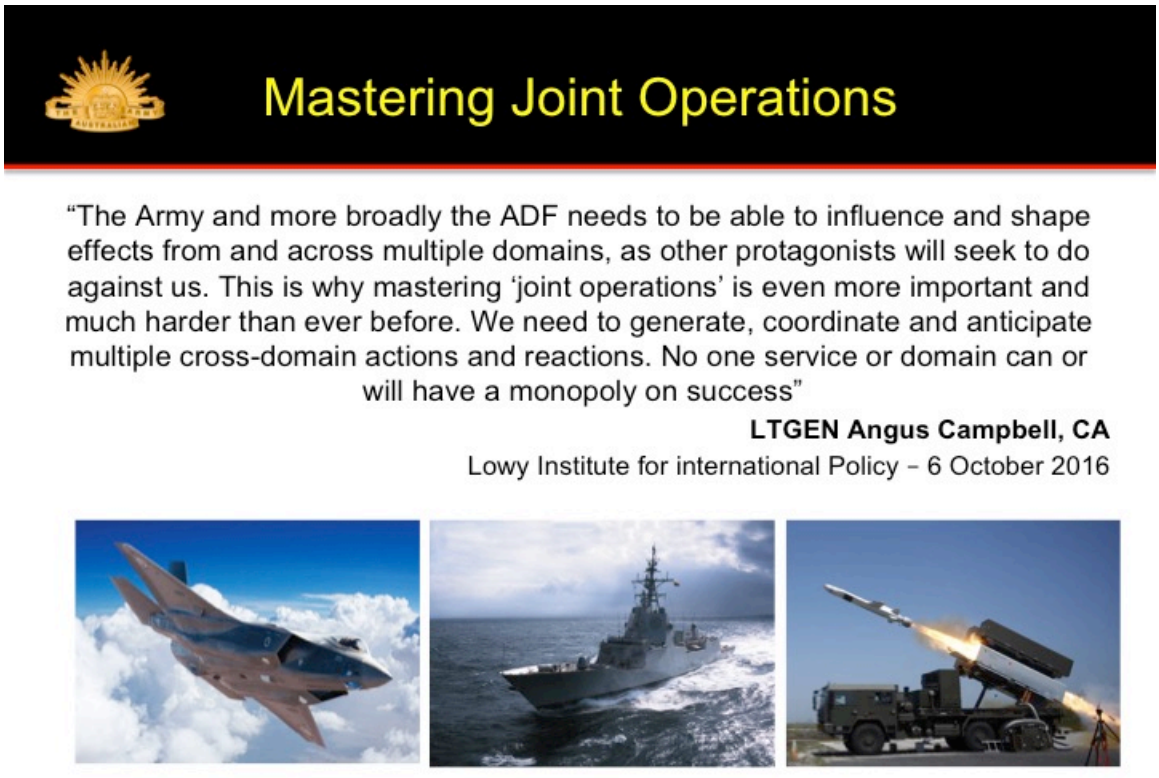
Answer: That is a fair way to put it. The Special Forces are generally able to access a whole range of joint effects for their particular tactical tasks. As a result, allowing small teams to achieve large effects.

We need to take, as you said, that mental framework and apply that to what we call the joint land force.

Within the ADF context the joint land force refers to all of those services that are collectively working to fight with Army to fight the land battle. By its nature that joint land force is by its nature, purple.

Importantly, not only do you have to package this small team appropriately, but also we have to ensure these small teams are capable of being dynamically repackaged on the fly with joint effects. For example, if a combat team now needs additional EW because of a change in threat or mission, the combat team will be able to leverage the required additional EW support from the joint force in time frames far quicker than the past.

The reality is that as we move beyond this decade we need to be capable of pushing support further down from division level and making it more readily available and more dynamically available to the small group level. Empowering the small group with joint effects in seconds and minutes not hours and days.



The time responsiveness of an Air Tasking Order that's 72 hours old is really not going to cut it.

Second Line of Defense

I would suggest that time line needs to be radically truncated.

The Chief of Army made the point at the Airpower Conference that in many ways we are still using procedures and approaches that go back to World War II for air-ground operations; this makes no sense in terms of technological advances and operational shifts.

We need to shape a 21st century approach.

It is also no longer just about air-land integration; it is about multi-domain integration at the small group level.

During our April 2017 discussion, BG Mills highlighted the evolving approach to defense modernization for the ADF. With the new Defence White Paper, a new organization was created namely, the Defence Innovation Hub.

According to an MoD White paper released on December 2016:

On 25 February 2016 the Government released the 2016 Defence Industry Policy Statement (Industry Policy Statement). The Industry Policy Statement, together with the 2016 Defence White Paper and the 2016 Integrated Investment Program, set out the Government's strategy to enhance Australia's defence capability including through collaboration with defence industry and other science and technology research partners.

A key element of the Industry Policy Statement is the establishment of the Defence Innovation Hub (Innovation Hub) for the Department of Defence (Defence). The Innovation Hub will rationalise and simplify the existing Defence innovation programs into a streamlined program that nurtures and matures proposals through a single innovation pipeline.

Critical to the success of the Innovation Hub will be a supporting policy framework to transform the way that Defence approaches innovation and collaborates with industry and other research organisations.

The Innovation Hub is connected as well with the Defense Science and Technology Group's Next Generation Technologies Fund.

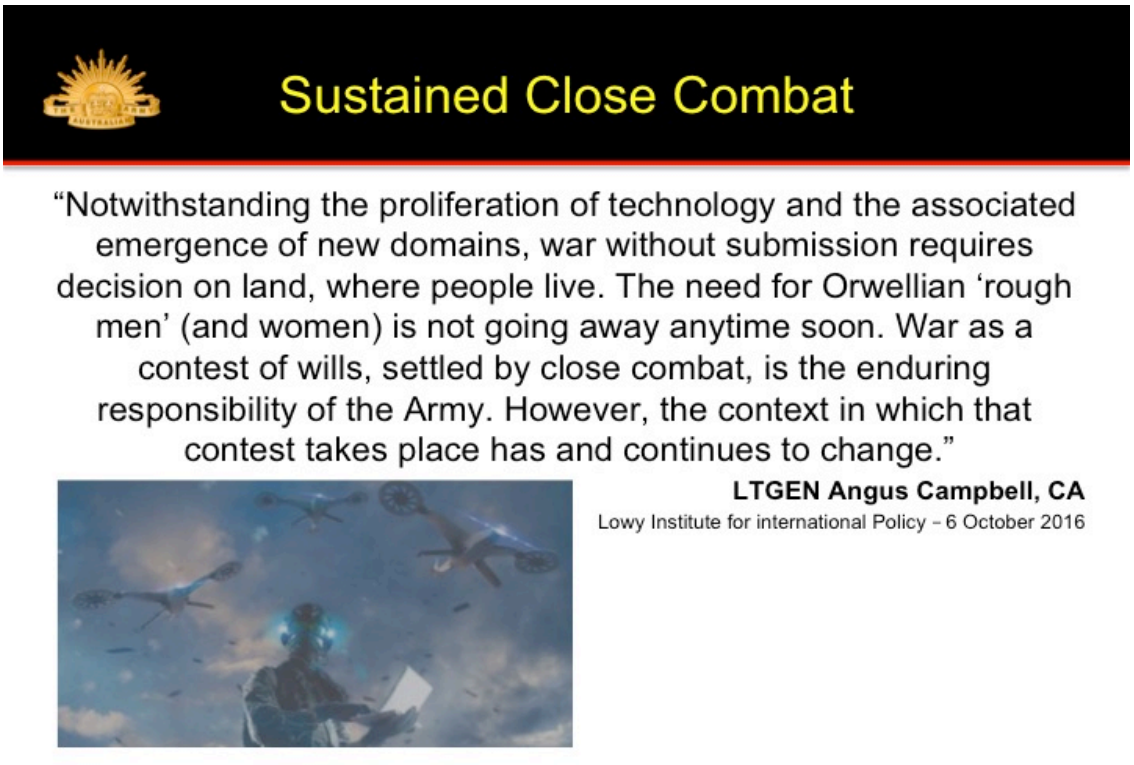
"The Defense Innovation Hub, which works under Kate Louis which was announced in December of last year, has a significant amount of funds to support innovation initiatives, and it's also linked to the Defense Science and Technology Group's Next Generation Technology Fund.

Working with DSTG and the Innovation Hub provides the Australian Army with opportunity to solicit good ideas from industry, and then look at working with the respective companies at shaping innovative technologies to the point where they can eventually affect major capital acquisition projects."

BG Mills then went on to describe some examples of innovation over the past three years, which illustrate how Army wants to shape its modernization approach.

The first example was the development and acquisition of a micro-UAV, a product that he highlighted during a presentation at the Williams Foundation last year.

"It started with an Army Innovation Day in which we put the challenge to industry of providing a small UAV which could be used by small army units. A number of companies trialed their capabilities and we then picked one – the Black Hornet – for further trials. We established a trial in one of our brigades and within Special Forces. It was deployed to Iraq for a short period of time. We like it. Patrol reports were very favorable. We are now looking to enter into a contract with a company to procure enough Nano-UAVs to equip every one of our platoons and vehicle troops with its own Nano-UAV."



A second example and one that involves working with the Innovation Hub involves the development of autonomous vehicles and how these vehicles should inform "our future requirements."

The LAND 400 project is seeing the replacement of the venerable M-113 with a new vehicle. According to the Ministry of Defence:

LAND 400 – will acquire and support the next generation of Armoured Fighting Vehicles (AFV) with the firepower, protection and mobility to defeat increasingly lethal and adaptive adversaries well into the future.

LAND 400 will deliver enhanced levels of survivability to the Joint Land Force including sensors, weapons and information systems, which will be, networked to strategic intelligence platforms.

At its foundation, the project will deliver replacements for the Australian Light Armoured Vehicle (ASLAV) and M113 Armoured Personnel Carrier (APC) fleets.

The project will also provide specialist Manoeuvre Support Vehicles (MSV) to properly enable Army's combat brigades to undertake joint land combat.

LAND 400 has four discrete phases:

- *LAND 400 Phase 1 – Project Definition Study (completed).*
- *LAND 400 Phase 2 – Mounted Combat Reconnaissance Capability, primarily enabled by the Combat Reconnaissance Vehicle (CRV) mission system (the ASLAV replacement)*
- *LAND 400 Phase 3 – Mounted Close Combat Capability, primarily enabled by the Infantry Fighting Vehicle (IFV) (the M113 APC replacement) and MSV mission systems.*
- *LAND 400 Phase 4 – Integrated Training System*

http://www.defence.gov.au/dmo/EquippingDefence/Land400

Second Line of Defense

This is a major procurement program within MoD for Army modernization. But BG Mills highlighted the importance of a potential offshoot program to be supported by innovation involving the development of autonomous vehicles technologies, which could complement the main acquisition project.

"One of the options we could explore is to take legacy vehicles, such as the M113, and install an autonomous vehicle kit. As a result we could get a vehicle, which could be used, for the dirty and dangerous missions which are currently being done by our troops. Further more this would be a relatively cheap and value for money option for the Australian tax payer."

"For example under this context the M113 could now become an autonomous resupply vehicle. I need the resupply to go from X to Y. Its protection level is not as high as our manned vehicles, LAND 400, but it doesn't need to be. There's just bullets, beans, etc. in these vehicles, but they can make their way autonomously from point X to point Y."

Another example where autonomous capability could be leveraged in the army modernization approach is to replace humans doing counter-mine searches with autonomous vehicles.

"I don't want a man or a woman doing that in the future. I want an autonomous robot, autonomous vehicle, clearing the ground in front of the patrol. There are a number of companies around the world that have got very advanced autonomous vehicles robotics that could do that task now. We're looking to run trials in the back end of this year and throughout the next couple of years."

The Army is modernizing and doing so within the evolving joint context.

"The Australian Army is presented with the opportunity of transforming itself. It's really understanding and ensuring that we get more than the sum of the individual parts, that they work collectively together and what we get is more than just the individual pieces of equipment. And for us, this means a focus on a modernized combined arms team."

"We need to ensure that as we modernize the combined arms team, that it is configurable, with the right troops and equipment for the task, and scalable, with the right number of people, from a combat team of about 200 people to a battle group, three to five combat teams and their support elements, to a brigade, 3000 to 5000 people, which is three to five battle groups and their support elements, and ensuring that the glue that makes the collective capability operates effectively in a range of combat settings."

When I was last in Australia, the LHD trials were starting and the Army was looking at ways to make effective use of this new capability. I asked him to provide an update on progress to date.

"It is going well. We have put our Land battlefield management system on the ship and we can now use it to prepare for ground force insertion. We can do collaborative planning on the ship digitally and then prepare the force for deployment off of the ship."

"Next we are looking to incorporate beyond line of sight communication capabilities to the Land battle management system on the ship and to have that ready by the next Talisman Saber exercise."

For a look at the Australian Army's Battle Management System, see the following:

http://www.defence.gov.au/dmo/EquippingDefence/LAND-75-ph3.4-BMS

http://www.defenseindustrydaily.com/australia-turns-to-elbit-for-its-battle-management-system-06247/

PLATFORMS, CAPABILITIES AND SHAPING THE JOINT EFFECT

The Australian forces are adding a number of new platforms. The challenge is to do so not from a stove-piped perspective but from a broader one, namely, understanding the capability set which the new platform can provide and how it gets woven into the integrated force.

These interviews were conducted with key players involved in operating or standing up key platforms enabling the 21st century combat force.

An Update on the Australian Wedgetail and Its Evolution: A Discussion with Wing Commander Stuart Bellingham

During my visit to Australia in April 2017, I had a chance to continue my discussions with Group Captain Stuart Bellingham, Officer Commanding Number 42 Wing, about the Wedgetail and its continuing evolution.

The Wedgetail has demonstrated in the Middle East and in high end warfare exercises that it is a very good fit for the shift to a fifth generation enabled air combat force. Most recently, I heard from USAF and RAF personnel involved in the first Red Flag this year, how impressive they found the aircraft.

As one senior RAF pilot put it: "I would never fly with an AWACS if had a choice. I would only fly with Wedgetail."

Obviously, Number 2 Squadron and Number 42 Wing have made an impact on air combat thinking.

In this year's Red Flag 17-1, the F-35 and F-22 flew with RAF Typhoons and USAF F-15s along with the Sentinel UK aircraft and the Aussie Wedgetail, along with other assets as well. But the exercise was notable in terms of the first appearance in Red Flag 17-1 an exercise in which one combat participant noted: "In this exercise, the F-35 reshaped how we are thinking about the use of our entire air combat force. The question was not what the F-35 could do for the rest of us; it was what can we contribute to the F-35 led air combat force?"

The Wedgetail certainly found its place in answering that question and in providing unique quarterback functionality to the force and to support functions from an ISR and C2 role as well.

Not only did the Wedgetail show up, but the Officer Commanding 42 Wing played a key role in the exercise as well.

According to an article published in Australian Aviation on February 14, 2017:

GPCAPT Bellingham was the first non-US participant to be Director of the CAOC, leading 250 American, British and Australian personnel. This was the first time a coalition nation has performed this role in such an exercise.

"We are integrated with these capabilities from start to finish, from planning missions, through to debriefing the missions," GPCAPT Bellingham said.

"Australia has air battlespace managers from No. 2 Squadron and No. 41 Wing who are controlling the Red Flag airspace, and getting first-hand experience how these capabilities can be employed.

"We're getting real insight into understanding the capabilities and what Australia's future is going to look like."

http://australianaviation.com.au/2017/02/exercise-red-flag-2017-concludes/

Question: I think Red Flag 17-1 is a good example of how we collectively are shaping a way ahead.
Second Line of Defense

In effect, we are training a network of operators who can shape high intensity air operations under the impact of fifth generation warfighting concepts.

The technology is crucial; the platforms are important; but it is the training towards where we need to go that is crucial, rather than simply training to the past.

Is that not where your experience with Wedgetail and working with allies comes in?

Group Captain Bellingham: That is a good way to set up the discussion.

I think the strength of everything we're doing at the moment only comes from a strong cooperation with our allies. Obviously, we're a tiny force, and our relevance and real strength becomes fully apparent when we tie our capabilities with those of our allies.

At Red Flag 17-1, we saw the US, the UK and Australia blending advanced assets together to make the entire force more lethal and survivable in the high end threat environment.

Question: The F-35 plays a key role in shaping the battlespace and target identification for other air assets.

What is the Wedgetail's role in that context?

Group Captain Bellingham: As we evolve the capabilities of Wedgetail, we see key roles it can play as a quarterback in a high-end fight. And as we upgrade the software and hardware capabilities, it is only by interacting with the other assets in that air combat environment that we can truly evolve new ways of doing things.

It's not just we've updated the software and now we've got a great radar. That's a continuous process, and every time we go to these exercises and go, "You know, that was kind of neat. How do we make that repeatable, and how do we embed that in our doctrine and TTPs?"

Our true strength comes from multiple nations working together and blending their capabilities for the fight, because it is simply very difficult for any one nation to fund and deploy all the high-end capabilities we need.

Our Wedgetail contribution can be seen in this light.

Question: Let us return to the concept of shaping a network of operators for 21st century high-end operations.

How do we best get this done?

Group Captain Bellingham: It is about deploying your new assets, and learning how to use them in an interactive context. For us, it is starting with Wedgetail, and then moving to Growler, and then to F-35, to P-8, to Triton and so on, how do we shape an effective team to dominate in an air combat environment?

The platforms and technology is crucial but training to where we need to go and cross learning to evolve the combat force is absolutely essential for shaping the air force we need to deploy.

We see our new Air Warfare Centre as a key opportunity to do just that. One evolving aspect is that our Air Force used to conduct Fighter Combat Instructor courses; and we would send a ground controller to the course to participate. Now the focus is on the evolution of holistic air combat capabilities and as part of that, we have a Wedgetail team participating in the Air Warfare Instructor course.

We've got several participants involved from the Wedgetail side: an electronic systems officer, a couple of the air battle managers, we have a pilot, and they're all working as a team in the airborne early warning and control space. During the course they will evolve AEW&C tactics, which are complementary to the overall Air combat domain, and they will all graduate from the course as Air Warfare Instructors.

They are working that quarterback space, to understand the needs and opportunities of that network of operators and how we can change our TTPs to make them more effective.

More broadly, we are focused on being an enabler not just for the air combat force but the joint force. For example, we are working with the Navy and the Army with regard to supporting expeditionary blue water operations and operating in concert with the new LHD and its evolving concepts of operations in the littoral space.

The enabler function is the key Wedgetail strength in terms of supporting the joint and combined combat force more generally.

Question: Wedgetail is a software upgradeable aircraft and is undergoing modernization along existing lines but you have some expanded capabilities in mind as well?

Group Captain Bellingham: We are modernizing the aircraft to enhance current C2 capabilities but we are looking at ways to exploit its extraordinary radar (via its scalability) to expand into the non-kinetic warfare space.

And we will do that as well through the cross learning we talked about earlier. We are working really hard at the moment in collaboration with our allies to get a team approach to accelerate our learning.

We are looking to build from the achievements we've done so far and build on that cooperatively with our allies.

We're working to get to the next level, and we're looking at the next generation of E-7, based on our operational experience and leveraging the collaborative networks we have established with allies moving into the fifth generation enabled air combat force.

Question: A final thought suggests itself.

Without the global engagement of Wedgetail in operations and exercises, the entire development process you described would not be possible.

And the Wedgetail would not be showing up if not for the presence of your KC-30A, a point that could be missed.

How important has the new tanker been to enabling Wedgetail to deploy and to shape its combat learning process?

Group Captain Bellingham: You have raised a very good point.

The two came into the force at about the same time. Without the tanker, we don't get the endurance and the ability to stay on task. We would not have the reach and persistence.

And our part of the world we have vast distances and lots of open water, we need the expeditionary capability that a tanker brings, and a good tanker that can offload a good amount of gas and has great reliability.

Second Line of Defense

The KC-30A, what it's demonstrated on operations over the last two and a half years has again been phenomenal. Whilst it had a few initial teething problems with the boom and other things, that tanker is going from strength to strength. Without it, we're irrelevant, because we can't do that expeditionary work which we need to be able to do. That's important in the Middle East, but even more important in our part of the world.

Building Tanker 2.0: The Aussie Perspective

During my latest visit to Australia, I had a chance to discuss the way ahead for the KC-30A with the two senior operators involved with the program and its evolving capability. We met at Amberley Airbase where the KC-30As and C-17s are based. Air Commodore Richard Lennon is the head of the Air Mobility Group and with Group Captain Adam Williams, the officer commanding 86th Wing as well as the CO of the 33rd Squadron (KC-30A).

Last year, I published an interview with the head of the tanker program at Airbus. And in that piece underscored that having digested the operational fundamentals with the tanker, the tanker program was now moving on to the next phase, which I have called Tanker 2.0. The baseline tanker is fully functional; now what other capabilities can be added to it as it moves beyond being a gas station in the sky?

http://www.sldinfo.com/tanker-2-0-the-a330-mrtt-evolving-as-a-global-fleet/

Also, since I was last here, the Ministry of Defence has signed a new partnership to shape the way ahead for Tanker 2.0. This agreement was announced at this year's Avalon Airshow.

In an article published on March 18, 2017, we highlighted the new partnership agreement.

The Aussies have also signed an agreement with Airbus Defence and Space to partner in shaping what one might call Tanker 2.0, or the smart tanker. The tanker is a mature military product operated globally and now Australia is laying the foundation for the next transition, to shape new innovations through automation and linkages to shape the smart tanker.

According to a press release by Airbus Defence and Space:

Melbourne, 2 March 2016: The Royal Australian Air Force (RAAF) and Airbus today signed a research agreement to further develop the RAAF KC-30A's capabilities.

The agreement strengthens the industrial partnership between Airbus and Australia's defence force, and will help to define the evolution of the KC-30A fleet as it reaches operational maturity and expand its capabilities.

This will result in the KC-30A's core transport and refuelling capabilities supporting the RAAF's transformation into a fully integrated force, capable of tackling complex contemporary defence and security challenges.

The agreement's first milestone is the joint development of the automatic air-to-air refuelling (A3R) concept, which represents a major step forward in in-flight refuelling.

Automating boom refuelling contacts reduces potential risk by minimising operator workload, and increases operational efficiency by cutting the time for each contact. The system requires no additional equipment in the receiver aircraft.

Initial approach and tracking of the receiver is performed manually from the A330 MRTT's console. Once the image processing system acquires the receiver and the receptacle position, the operator can use the system aid allowing the boom to automatically follow the receptacle. Final extension of the boom's telescopic beam is manually performed by its operator to make and maintain contact.

Fernando Alonso, Head of Military Aircraft at Airbus Defence and Space said: "The KC-30A offers tremendous combat potential at the heart of the integrated Air Force of the Future, including using the platform as a Communication Node, to maximise air power delivery."

Air Marshal Leo Davies, Chief of Air Force, RAAF, highlighted the value of ongoing defence and industry collaboration.

"We are delighted to contribute to the research and development of A3R with Airbus to automate the process for boom refuelling without the need for control by our on-board air refuelling operator", said Air Marshal Davies.

The Royal Australian Air Force and Airbus have successfully performed proximity trials, with physical contacts planned for the near future.

The interview started with Group Captain Williams providing an update since our last meeting at Amberley in August 2016.

"We have been performing very well with our KC-30As globally. In the Middle East, using only one tanker on rotation, we just passed our 75th million pound level in delivery of fuel to the combat force in that operational area.

"What does it mean? It means that we've got some significant experience with this airplane now."

He added that the clearance process has continued with the F-16s have been added to the planes which KC-30A has been cleared to support.

"When US F-16s were in the theater we tanked them. We have a thriving boom business in the area."

He added that the experience with the F-16s is a good way to get ready for their support to F-35s. They are tanking Japanese based USAF F-16s as well and are getting ready to do so for the Singapore Air Force as well."

As the KC-30A goes through a steady stream of certifications, the USAF personnel involved in certification at Edwards have now gotten used to how best to certify the software boom system used by the KC-30A.

This meant that the recent B-1 certification program happened quite rapidly as the familiarity with the KC-30A has increased within the USAF.

"We conducted a short certification campaign of 12 flights to get the job done."

The Aussies are participating in the Coalition Air Refueling Initiative (CARI) as well. This is a USAF-run program of standardization of tanker operations. And because the KC-30A is part of a global fleet of Airbus 330MRTT tankers, Aussie certifications are also certifications for other nation's 330MRTT tankers as well.

This standardization process for tanking is crucial to shape a global coalition capability to support allied tankers worldwide, notably as the combat air force is designed to move to needs rather than to simply be based always at the point of need.

Working with the KC-30A was a first for the USAF for they had not worked with a software driven boom before.

"They went through a lot of test points and a lot of analysis to understand both how the KC-30 worked and how the software boom interacted with the receiver behind it."

Second Line of Defense

Because the USAF is now familiar with the KC-30A and the workings of its software-driven boom, the certification process for other aircraft can be shortened considerably.

Air Commodore Lennon added: “The test community has done a fantastic job at really narrowing down the requirements for a software driven boom, and when we make software changes to the boom we don't want to be retesting every single aircraft again. We want to be able to assess those changes against the baseline that we already have and get on with it.”

The software enabled boom poses challenges as well to managing the way ahead for coalition air forces, given the need for managing the intellectual property of the builders of the two aircraft which will have software enabled booms, Airbus on operational tankers now and soon Boeing with its KC-46A.

As Air Commodore Lennon put it: “Every tanker needs to be capable of tanking every receiver. That is the goal. We do not want to have IP differences get in the way of that requirement. We need to shape a good level of data sharing without compromising the IP of the two companies.”

“Software driven booms designed by dissimilar companies will respond differently to diverse operational situations and we need to narrow this difference for operational stability. We need as operators to set standards so different manufacturers can design their booms to respond in a predictable, pre-determined manner. Designers might shape different approaches via their software, so long as they deliver that common result.”

“ Legacy booms are mechanical and the operator drove the boom in accordance with standard procedures. The boom operator positions the boom to a common point in accordance with common procedures. We want to make sure that the software can achieve the same outcome. This is especially important where new booms have software driven functions such as automatic disconnect. It is important for the receiver to know what the boom will do next.”

We then discussed the progress in the automatic boom being worked with Airbus.

According to Air Commodore Lennon: “The best way to think about the new boom capability is that it is an automatic boom similar to how auto pilot works in the cockpit. The automatic pilot simplifies the pilot load, but the pilot is still there and can override the autopilot in case of need. There will always be an operator monitoring what's going on with the boom, deciding what the boom should do, and when it should do it, but now he can let the boom do all the work of positioning and marrying up with the receiver.”

The KC-30A is a refuelable aircraft so with a fatigue reducing automatic boom, the crew can stay airborne for longer to generate additional operational impact and enhanced sortie generation effects.

Air Commodore Lennon saw other potential impacts on operations as well from having an automatic boom.

“If it can anticipate and react to movements of the receiver aircraft faster than the boom operator can, then you end up with faster contacts. You also potentially end up with more consistent contacts when the turbulence level increases, in cloud or when night falls.”

We then discussed the partnership with Airbus through which the RAAF is working the new capabilities for the now fully operational KC-30A baseline aircraft or Tanker 1.0.

Air Commodore Lennon felt that “the agreement signed at Avalon represents a significant maturing of the relationship with Airbus. It was interesting that we declared final operating capability for KC-30A at Avalon

and then within five minutes we were signing a cooperative agreement to take the capabilities of the tanker to the next level."

Both Lennon and Williams saw the maturation of the relationship with Airbus as critical when moving towards Tanker 2.0.

I think they've definitely turned a corner in terms of maturity. They are not just trying to sell airplanes anymore but operating as a global fleet steward. They are offering us a menu of choices for how we might modify the aircraft going forward, rather than selling us a single solution."

We then returned to a topic which I had discussed with the Group Captain last August, namely the advantages of the pairing of the C-17 with the KC-30A. The Aussies given the vast areas they cover use their tanker as a fully loaded fuel asset and given its significant fuel load maximizes the number of receivers that can be deployed over long distances. This means though that they want to fly with a C-17 to carry the kit, people and support equipment that is displaced by fuel on the KC-30. Hence the importance of the pairing.

According to Williams there are two clear recent examples of how this works.

"We brought F-35s and Growlers to the Avalon air show and we did so by supporting them with a KC-30A and C-17 pairing. For long range operations, the pairing works very well for us."

In contrast, for operations within Australia the tanker can be used not only to fuel but to lift personnel and cargo as well in many operational settings.

Editor's Note: in December 6, 2016 story published by the USAF 88th Wing, the CARI validation process with the KC-30A and the B-1 was described.

WRIGHT-PATTERSON AIR FORCE BASE, Ohio – Officials in the Air Force Life Cycle Management Center's Tanker Directorate, headquartered at Wright-Patterson Air Force Base recently announced the successful completion of refueling tests between the Australian Air Force's KC-30 and the U.S. Air Force's B-1B as part of the Coalition Aerial Refueling Initiative (CARI).

From Oct. 25 – Nov. 9 the coalition team executed seven sorties totaling 27.4 flight test hours, encompassing 185 contacts and offloading a total of 275,150 pounds of fuel. The testing was completed two weeks ahead of schedule.

"CARI is significant because it fosters international cooperation by leveraging the combined assets of our coalition partners," said John Slye, director of engineering for the Tanker Directorate.

"This is not just a U.S. Air Force mission, but a global mission because of the reliance on aerial refueling as a force extender, force enabler, and force multiplier.

"The results of CARI offer a significant return on investment; providing aircraft refueling services and increasing tanker availability while improving the interoperability of the United States and its coalition partners."

http://www.wpafb.af.mil/News/Article-Display/Article/1021512/coalition-aerial-refueling-initiative-successful/

Group Captain Braz and the Coming of the Growler to the Australian Defence Force

Second Line of Defense

During my visit to Amberley Airbase in Australia, I had a chance to talk with the 82nd Wing Commander, Group Captain Braz on April 3, 2017. The Wing had been reorganized to include both Super Hornets and Growlers as the RAAF prepares for the fifth generation air combat transition.

Group Captain Braz has been in the RAAF for thirty years; originally he was an F-111 operator and then transitioned to Super Hornet, which was the RAAF selection of the aircraft to transition from the legacy aircraft (F-111) to the fifth generation aircraft (F-35). He was one of the pioneers in that transition (the first commander of 1 Squadron when the Super Hornet came into the force) and now is part of the next one (as the F-35 comes into the force). In addition to many other postings and duties, he served as the Growler transition team leader in the RAAF headquarters for two years as well.

Question: Let us start with the challenge of transition. The Super Hornet was an important stimulus to change in the RAAF going from the F-111 to the Super Hornet, going from the mechanical to the initial digital age.

How disruptive was that transition?

Group Captain Braz: The Super Hornet was acquired to reduce risk with regard to our air combat transition.

We were operating the F-111, and we were the sole orphan operator of the F-111, an aging airframe with declining relevance. We knew the F-35, the new generation was coming but with uncertain timelines. And we had an aging classic Hornet fleet, which was starting to show more signs of its age.

We realized that there was an opportunity to acquire a bridging fighter, the Super Hornet. And by acquiring this aircraft we began to address the security challenges associated with a data rich aircraft and to change our security culture and engage in the new operational concepts that the Super Hornet enabled.

It had capabilities that we'd never had to deal with before or think about before. While they're not F-35s, they do generate inputs in to rethinking about how to deal with the coming of the F-35.

The Super Hornet gave us that intellectual kick to think more broadly, and to adapt how we do things, and to not be wedded to historic approaches with regard to operating concepts.

Question: How many Growlers are coming to Australia?

Group Captain Braz: We've got four in Australia right now. By the end of the week, we should have seven, and we'll have all of them here by June. We will have 12 in all.

Question: The Growler is coming when much is in flux with the RAAF with the significant impact of tanker and Wedgetail, and the coming of the F-35 as well P-8 to the force.

How does the coming of the Growler intersect with the broader changes for the RAAF?

Group Captain Braz: From an ADF force-wide point of view, there is a huge amount of change. That's both a threat and an opportunity.

We've come to understand that we have to fight in the new information realm, and Growler allows you to do that more effectively. Further, it changes how we are thinking about how we employ the existing capabilities with the new capabilities. We're reshaping our technical and operational thinking to harness and to capture what Growler can offer in the operational space.

It's an opportunity while there is so much change to think wholesale about what we're doing and how we do it, and to integrate it from that very ground floor level with those new capabilities that air force is bringing to enable the joint fight and to support the joint fight.

Question: In effect, you are shaping a community of tron warriors who operate specific platforms, but who will shape a broader community of users beyond the platform specific uses.

How do you view this shift?

Group Captain Braz: That is a good way to look at the process of change.

We are looking at ways to get the operators of specific platforms to cross-learn from each other, particularly as we add Growler, evolve Wedgetail, add P-8 and add F-35.

We're also exporting our Growler experts into the wider joint environment, such as to our new Air Warfare Centre. We used to have a very fighter-centric fighter combat instructor course. Now this is changing under the influence of standing up the Air Warfare Centre and the Air Warfare Instructor Course.

Now we are focused on force integration. We've integrated as best we could this year with the course that's running right now, including wherever possible the Growler folks who have been in country on and off this year already.

We're tying in those other communities, the E-7, the ground-based air surveillance teams, the P-8 teams, the air mobility and tankers, because we see opportunity to shape a broader set of perspectives.

We are aiming to get the right integration mindset amongst the communities, which would enable us to take the team into new, and creative, innovative ways of operating. We seek to bring technology more quickly on and off platforms. And we are doing so to find new ways to interact and to share information, and to create the web of options that will give us redundancy and resilience in our decision-making process.

Question: In effect, you are focusing on a 21st network of operators, rather than simply focusing on optimizing information flows.

And in that regard getting a small operator community onboard the Growler and then proliferating them in the crafting and evolution of a tron warfare community is what Growler for Australia is all about?

Group Captain Braz: That is a good way to look what we are about. We need to get the experience which Growler can deliver and share the knowledge.

The difficult thing with Growler is that it delivers non-kinetic effects, and sometimes they're difficult to measure. We're used to being able to deliver effects through other systems where the outcome is tangible and measurable.

For a Growler, if you're attacking a threat system or the people operating that threat system, then often it's difficult to truly assess how much you're affecting that system. You can do trials and tests in certain scenarios, but it's never quite the same, and so you get a level of confidence about what immediate effect you can achieve, but it's the secondary and tertiary effects that we're often looking for that are sometimes harder to measure.

The difficult challenge will become knowing how degraded the network is and how reliable the information is at any given point. If you create enough uncertainty in the operators, then you can achieve an effect even if it's not degraded.

Second Line of Defense

Question: Who are your initial customers in the ADF for the Growler produce?

Group Captain Braz: Clearly, the Joint Operations community, and special operations are key clients of interest. We are making sure that the Air Operations Center and the Joint Ops Command framework have appropriate access to Growler expertise.

Another joint customer is our Deployable Joint Force Headquarters, which is conveniently located here in Brisbane.

Question: Clearly, the Australian Army modernization approach is built around small engagement packages, which can have significant effect. Does not a Growler capability fight right into their mental furniture?

Group Captain Braz: It does. We know that a small force over a wide geographical area like Australia, we do need to be maximized in our lethality and our personal security, including force protection.

We need to make sure that we can have that relative advantage over our adversaries. Growler gives us that opportunity to shape that role, not always being able to protect ourselves entirely from that attack from the potential adversary, but certainly to inflict similar pain upon them, and retain the relative advantage in decision superiority that gives our small force what it needs.

Question: What can be missed is how important cross learning is among the professional military working together as allies. I like to argue that if you want to make America great again, accelerate learning with allies.

This certainly applies to your area of work.

How would you describe your work as an Air Force officer with the US Navy?

Group Captain Braz: We couldn't have done this without a huge commitment from the U.S. Navy. There's simply no other way to describe that.

They have wanted us to be on this journey, and they have supported us wholeheartedly throughout it, both on what we do with the Growler training and the operational experience, the exchanges we've established, and how we prepare the team.

That's furthered by exchange opportunities. We have U.S. Navy Growler aircrew joining us here, but we've also used folks connected to intelligence organizations and data management organizations and used U.S. Navy expertise in those areas to bring us along and further on the journey.

It's no accident that when the Growler officially arrived in Australia at Avalon International Air Show a month or so ago, one of the four humans to step out of those two aircraft was a U.S. Navy aviator. That was very deliberate, because we wanted both to recognize the amazing support we have had so far from the US Navy and the fact that we're in this together.

It's a partnership for the long term with cross learning on all sides.

Shaping Cultural and Generational Change in the RAAF: The Perspective of Air Commodore "Zed" Roberton

During my visit to Amberley Airbase on April 3, 2017, I had a chance to discuss the work of the Air Warfare Center and of new training programs in the Air Combat Group to shape a more effective fighting force.

I have talked with Air Commodore Roberton in many places in Australia and he is clearly a force of energy on the move.

If he fights in an air battle like he operates on the ground, the adversary better be on his toes!

The last interview I did with him was in his office in Williamtown and focused the airpower transition which the RAAF is undergoing as it adds an impressive range of new platforms and capabilities.

The transition for Roberton is about shaping airpower for integrated operations in the information age; it is not about staying in the 20th century world of disaggregated air from maritime from ground forces.

It is about shaping an integrated force driven by the new fifth generation approach.

And for the RAAF, this approach is crucial because unlike the USAF or the USN, the RAAF does not have a large force of specialized aircraft to operate in an evolving approach to integration; the RAAF with the Navy and the Army need to lead a process of force structure integration shaped by a key driver like the F-35.

http://www.sldinfo.com/shaping-the-airpower-transition-the-perspective-of-zed-roberton-commander-air-combat-group-raaf/

In this interview, which was conducted at Amberley Airbase where the Super Hornet/Growler wing is located, we focused on how he saw that transition proceeding as the new Air Warfare Centre had been established and was positioning itself to be a key element in shaping the transition.

He emphasized that the focus was upon shaping an integrated air warfare perspective, moving beyond a platform specific context.

He thought it was proceeding well for two reasons.

“We are taking a kill web approach and working to integrate the non-kinetic into the force.

“We have to shape a cultural revolution.

“We need to get away from being comfortable with knowing what contribution my platform can make to the fight in very narrow terms.

“With the evolving concepts of operations, we don’t really care where the weapon comes from; we don’t really care how the information is passed.

“We need to have a framework where that’s devolved to the lowest effective level and we achieve it as a team.

“That’s kinetic and non-kinetic effects. That’s with regard to all different sorts of platforms.

“The faster you take a concept and a platform and weapons system and focus on its impact or effect at the tactical level, then the smart young women and men in our force will find a way to innovate in a way that we’ve never seen before.”

“That is really what we are after at the Air Warfare Centre.”

Indeed, according to Roberton, “we don’t want narrowly focused tactical operators.

“We want warfighters that can problem solve. That is why at the air warfare centre we give them problems they can’t solve.
Second Line of Defense

"They're wicked problems which require finding the best way to manage the problem going forward rather than tactically solving it in a narrow sense."

As I had met earlier at the base with the Wing Commander who commands the Super Hornet/Growler squadrons, we naturally discussed the coming of Growler into the force from the warfighting rather than platform specific perspective.

Roberton argued, "we bought Growler less because we wanted an electronic warfare platform than we wanted to get into a mindset and working relationship with the US which would translate into other platforms as well.

"We need to learn and expand into the broad non-kinetic warfighting area and acquiring Growler is a means to that end; it is not about simply operating an EW platform.

"It is about shaping a network of operators who can be informed by, and inform others in the ADF, how to broaden our non-kinetic warfighting skill sets."

It is about generational and cultural change.

"By the mid-2020s we want to have leadership across the ADF that does not think in or stay in their tactical stove pipes.

"They need to think kill web as a foundational approach to everything they do.

"This is the only way a small country like ours can deal with the defense and security problems we face.

"We can not afford stove pipes."

Finally, we discussed the innovative approach that the Air Combat Group is taking to enhance the ability to train pilots more effectively so that the proficiency levels remain high but that more pilots are graduated than previously.

How do you reduce the attrition rate in the training programs without reducing standards?

Or how to ramp up the pass rate of pilots to get better value out of the significant investments put into the pilot training programs?

At the end of this article, I have included two press releases issued in late 2016 by Air Combat Group, which explain more fully the "re-role program for fast jet pilots."

"We are simply not getting enough pilots through the training program, and we have looked hard at how we have done the training and have found that we can shift the training program to do a much better job of pilot training and retention.

"We have historically had a very rigid set of performance standards but by building a performance based system drawing upon principles of sports coaching we are graduating more qualified pilots than before."

Pilot training is very expensive and traditionally the RAAF would take about 20% of the graduates of basic pilot training on to a track to be trained as fast jet pilots.

And traditionally, they would pass 50 to 60% of those pilots into fast jets.

"Now with a combination of initiatives we graduated 43 fast jet pilots out of 48 for around a 90% pass rate. Again, this is without loss in the quality level, but by having a more realistic and effective training program."

The RAAF has adopted a new approach, addressing physical, mental and cultural changes as the key means to get these results.

"Innovative training is about taking more of a coaching approach to the task. It is also about giving our trainees the mental and emotional tools to cope with the stress and the challenges to a better job of self-improvement as well."

He argued that the sports business has provided a number of tools, which the RAAF has adopted for fast jet pilot training, including a physical endurance training approach to handling G tolerance.

"It's a change in mindset of our instructors as well. Some of our instructors now are involved far more in a coaching role, as opposed to just straight instruction.

"They are looking at helping pilots go though the process with far less of a 'testing mindset' as their primary focus of attention. If you take the testing mindset out, people learn at different rates and you can accommodate that basic reality of teaching and learning."

And this approach is paying off in operations.

Roberton noted that they are seeing enhanced pilot performance in operations like OKRA in the Middle East. "We have pilots who would have functioned as wing men, now taking a lead role because of improvements in their confidence levels and performance."

In short, Air Commodore Roberton is keen to foster cultural change throughout the force, whether at the air warfare centre or in the training process.

Below are the December 2016 press releases about changes in the pilot training program.

Air Combat Group develops improved training methodology and new approaches to re-role program for fast jet pilots

Air Combat Group has developed and implemented new strategies aimed at improving both the quality and quantity of successful fighter jet graduates over the past two years. Air Commodore Steve Roberton said ACG was now looking to transfer those successes onto the long-standing re-role program.

"We are always on the lookout for new fighter pilots and have transferred a number of training support initiatives to 2FTS graduate and re-role fast jet trainee programs for 2017.

"We want women and men flying the next generation fighter jets such as F/A-18F Super Hornets, F/A-18G Growler and F-35A Joint Strike Fighter," AIRCDRE Roberton said. " There is nothing elite about our aircrew. They are simply focused young Australians who benefit from world-class training and cultural support. It is far more achievable than many young people think."

The implementation of a structured and more thorough selection process for re-role candidates will be introduced to improve selection methodology, manage candidate preparations and enable individual trainee risk assessment and management," he said.

Second Line of Defense

This process will be supported by the delivery of Performance Enhancement Program (PEP) mentoring / coaching and a tailored preparation and induction program for re-role candidates prior to commencing their Introductory Fighter Course (IFC) at 79SQN.

"While still in their infancy, graduation numbers have been at historic highs with initiatives such as the PEP, fast jet trainee performance coaching/mentoring and 78WG Physical Conditioning and Injury Management Program (PCIMP).

"ACG has undergone a cultural change in the way we train fast jet pilots – even down to the language used in our training manuals," AIRCDRE Roberton said.

"The current re-role paper based application process will be supplemented by a one week Fighter Jet Selection course to be held biennially at RAAF Base Williamtown," he said.

"78WG will also develop a re-role preparatory course to be conducted at 79SQN utilising the new LIFCAP Simulator and basic skills assessment, PEP assessment of key mental skills, exposure to daily squadron working environments and visits/exposure to OCU and Op Squadrons.

"This will aim to familiarise successful re-role candidates with Pearce local area procedures, as well as refresh single pilot basics to a common level.

"The scheduling of preparatory training at 79SQN will remove the reliance on external agencies to 'prepare' trainees and therefore avoid the inconsistencies seen at present," he said.

"The course will include some back seat Hawk flying for familiarisation purposes. The preparatory course will be unassessed and can be tailored to the perceived training risks of the re-role candidate (for example, single pilot IF or formation basics dependent on trainee background).

AIRCDRE Roberton said ACG intended to promote its changed processes, and would seek to raise awareness of these programs wherever possible throughout the recruitment and training continuum within Defence.

Proud fast jet pilots graduate to fly F/A 18A/B Hornets

Royal Australian Air Force Base Williamtown has graduated eight proud young fighter pilots to fly the F/A 18A/B Hornet aircraft.

Commander of Air Combat Group Air Commodore Steve Roberton said Australia's new fighter pilots, including two exchange pilots, had worked extremely hard over the past six months and should be proud of their achievements.

"This achievement is even more pronounced as 2OCU are about to graduate their third FA18A/B OPCON without loss of a trainee through failure.

"Air Combat Group has put into place a training approach that uses concepts around 'performance' or 'sports psychology' to enhance fighter aircrew training.

"This approach encourages fast jet aircrew trainees and instructors to learn about, and develop an understanding of the key mental skills for success in fighter aviation.

"The program also utilises select flying instructors as Performance Coaches in order for them to assist trainees to develop their mental skills during lead in fighter training and operational conversion courses.

"We also utilise professional psychologist support and supervision as a proactive measure to improve both trainee and instructional performance.

"Although it is early stages in the new program which was introduced mid-way through 2015, it appears to have reaped rewards already.

"The Commanding Officer of 2OCU throughout this time, Wing Commander Adrian Maso should be signalled out for his role in leading this cultural reform and the 'hat trick' of successful training outcomes in the FA18A/B Operational Conversion Course," AIRCDRE Roberton said.

"The trainee pilots and instructors should be justifiably proud of their achievements," AIRCDRE Roberton said.

Officer Commanding Number 81 Wing Group Captain Tim Alsop also congratulated WGCDR Maso's approach to adopting a new training culture over his command.

"These graduating fight pilots will be put to the test when they join our operational Squadrons over the next few years.

"Australia's new fighter pilots have an exciting future ahead.

"They have the opportunity to fly F/A 18 A/B Hornets, and F/A 18F Super Hornets – but also in the near future F/A 18G Hornets (Growlers) which arrive in Australia next year.

"The F35-A Joint Strike Fighter is also expected to arrive in Australia in late 2018, and these young pilots can expect to fly the fifth generation technology.

Note: Recently, Air Commodore Zed Roberton has been promoted and is now Air Vice Marshal Roberton.

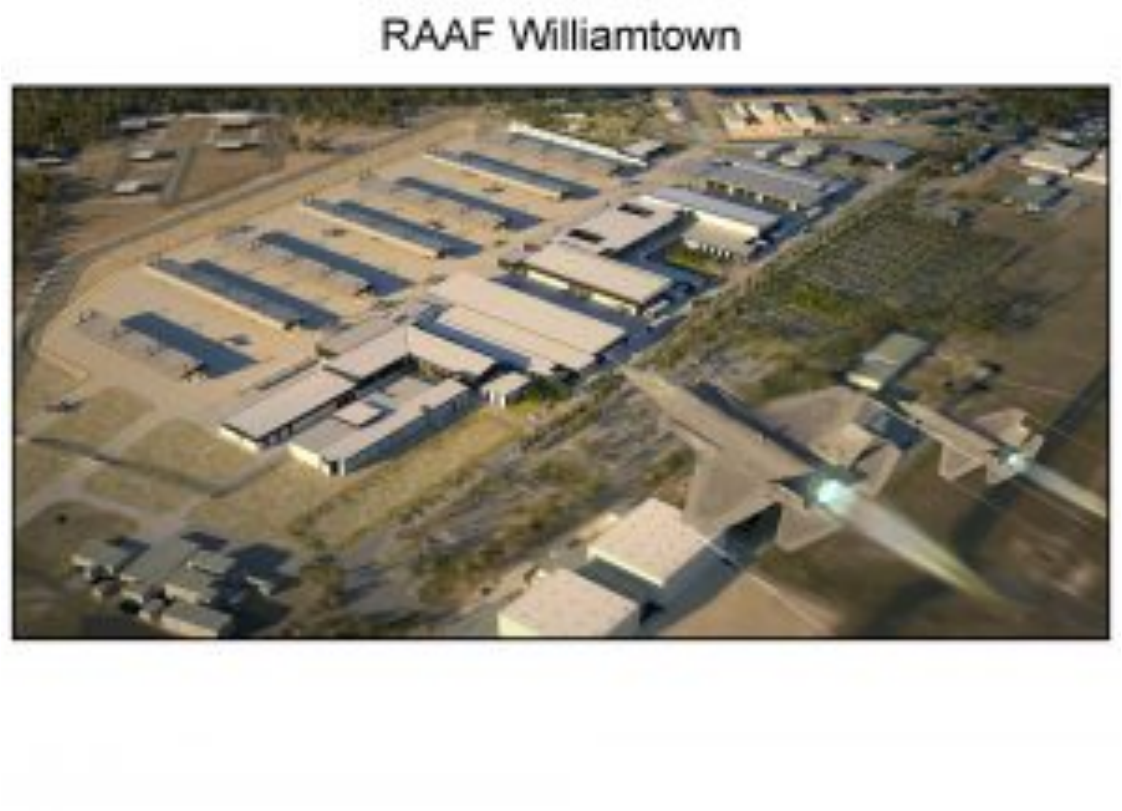
Second Line of Defense

Transitioning to the F-35: The Aussies and the F-35 Global Enterprise

During my recent visit to Australia, I had a chance to talk with Wing Commander Steven Bradley, Deputy Director Air Combat Transition Office, which is located in Canberra at Brindabella Park close to the airport.

Last year, I visited Williamtown where the initial facilities for the F-35 are being built.

http://www.sldinfo.com/visiting-the-raaf-williamtown-air-base-preparing-for-the-future-and-remembering-the-past/



RAAF Williamtown F-35 facilities in process of construction. Credit: RAAF

And last month, visited RAF Marham where the F-35 facilitates are being built for the UK, and at RAF Lakenheath where F-35 facilitates for the USAF are being built.

During the visit to RAF Lakenheath, the point was driven home about the importance of cross-learning with regard to standing up F-35 facilities worldwide.

Lt. Col. Vause: The cross learning is very important as we stand up our facilities here at Lakenheath.

We are visiting a number of facilities to see what their lessons learned are, and we then apply them directly to our standup here at Lakenheath.

Recently, we visited Yuma, Luke, Hill and Eielson to see what they have done and are doing in setting up or operating their F-35 facilities.

http://www.sldinfo.com/raf-lakenheath-prepares-for-the-future-usaf-f-35as-and-f-15s-combine-with-raf-capabilities-to-provide-a-21st-century-deterrent-force/

The UK is training its initial squadron in the United States and that squadron will then transition to Marham.

Similarly, the RAAF is training its pilots and maintainers in the United States and then the first squadron will be stood up at Williamtown.

Both the RAF and the RAAF will then stand up their remaining squadrons based on the use of their own newly built facilities respectively in Marham and Williamtown.

But the cross-learning will continue as US and allied F-35s operate with the RAF and the RAAF from their bases.

And cross learning across the services will be a high priority for both the RAF and the RAAF, although the senior service leaders in Australia have really hammered home the point that the F-35s flown by the RAAF will learn joint from the outset.

In other words, there are several transitions, which will go on throughout the standup of the F-35 in Australia.

First, there is the transition from the US to Australia.

Second, there is the transition at Williamtown where the first operational squadron the second squadron, which is to be a training squadron, will spawn.

Third, there is the transition associated with the IOC of the F-35 in Australia, during which the RAAF will operate throughout Australia with the services getting a good initial look at the aircraft.

Fourth, there is the interactive transition where Aussie F-35s fly throughout the region and beyond and cross learn with other global F-35 partners and US and allied F-35s operate in Australia and learn from the Aussies with regard to the evolving approach to joint integration.

In other words, because the F-35 is being stood up at the same time in many allied countries as in the United States cross learning is built into the standup and initial operating experiences.

Put bluntly, cross learning with regard to next generation high intensity operations is built in, whereby the U.S. will learn as much from allies as the other way around.

During my discussion with Wing Commander Steven "Rooster" Bradley, we discussed the transition process and his sense of the impact of the F-35 on the force.

Question: How important has been your engagement at Luke in standing up your initial F-35 squadron?

Wing Commander Bradley: The pilot training center at Luke has been crucial for us.

Our first squadron is not a training squadron but an operational one; therefore we have focused our initial training efforts in the United States on generating the required number of pilots, maintainers and support personnel necessary to declare Number 3 Squadron operational in 2020.

The second squadron that we will stand up at Williamtown will be Number 2 OCU, or Operational Conversion Unit, which is the school where we will train our pilots and maintainers.

Once we have our school up and running, we'll then look to transition our last two Classic Hornet squadrons, which are 77 Squadron and then 75 Squadron.

The transition is quite aggressive with each of the squadrons transitioning from the classic Hornet to the F-35 in a 12-month period.

When you look at other F-35 users and the stand-up rate for squadrons, they typically take around the 24-month mark to convert a squadron.

Question: So you are looking to innovate with regard to the US approach, which means in turn that as you learn how to shorten the process that learning approach could be available to the US or other allies for that matter?

Wing Commander Bradley: There may be the opportunity to share our training processes and procedures with other F-35 operators in the future, however that's not our focus.

We will be concentrating our resources on the standup of 2 OCU and the generation of a training syllabus that meets our requirements.

We will then shape and refine the process to ensure that the remaining squadrons can transition efficiently.

We face a major challenge in that we are not going to shut down a Hornet squadron and then set aside time to transition; we have to keep the squadron operational while we transition to the new F-35 squadron.

That is a challenge, which we need to meet.

We have trained five pilots to date at Luke and our 6th, who is the first squadron commander for 3 Squadron, is just about to depart from Australia and start his training.

Wing Commander Darren Clare has both a Super Hornet and Classic Hornet background, and we have a mix pilots who have flown both types in our first squadron construct.

Question: As you bring your first squadron and prepare for IOC, presumably you be flying in Australia and different services will see the plane as well?

Wing Commander Bradley: That is right.

The first aircraft will arrive at the end of next year.

We will then have 2019 and 2020 to work towards Initial Operating Capability in Australia.

We will be putting the F-35 through its paces in the Australian environment.

Our overall verification and validation process will happen in that two-year period.

We're basically examining every aspect of the F-35 system in the Australian environment and during that time, we will be working with army and navy as well.

By the end of 2023, we aim to have all three F-35 squadrons online and operational as well as the training school.

Question: How important is this transition for Australia?

Wing Commander Bradley: It is crucial.

We are looking at a very different kind of aircraft and a different kind of combat capability with the F-35 compared to our legacy fleet of Hornets and Super Hornets.

We had a saying as fighter pilots when talking fourth generation tactics, which is – speed is life and more is better.

In a fourth gen fight, if I could get higher and faster more quickly than the adversary, I would give my weapons more energy and I could launch my weapons first. If I achieve a first launch, then chances are I'll survive.

That's a simplistic look at 4th generation tactics but that was why speed was so important back in the day.

A lot of people are still hanging onto that concept.

Whilst speed is still a factor in a 5th generation environment, the whole mindset has shifted to now 'information is life, and more is better'.

The information dominance of this particular platform is purely outstanding.

We've seen in this most recent Red Flag where F-35As were participating for the first time, that even if the F-35s had dropped all their weapons and had fired their missiles, they were still remaining inside the airspace to provide situational awareness to the rest of the participants in that force.

The information gathering and information sharing capabilities of this aircaft are so far advanced compared to anything else out there.

The information sharing capability of the platform is purely outstanding.

Knowing exactly what's going on in the battlespace at any one particular time is the key to success and the key to survival in a 5th generation fight.

In a fourth generation world, I had to manipulate multiple sensors to be able to do that.

I had to take my radar display, and other displays and work integration in my head while flying the aircraft.

I had to take in communications from our controllers.

I had to take in communications and data from a wingman to build the picture until my platform was in a position where I could see the adversaries.

I don't have to do that anymore, because of the data fusion capabilities of the F-35, which provides extraordinary situational awareness to the pilot.

Question: You are also focusing in your description on the need to have multiple support assets flying with you to support your strike mission as well?

Wing Commander Bradley: There's no actual requirement, as such, to fly with multiple support assets, as the F-35 can operate successfully without them.

Having said that, by executing in this fashion you won't necessarily get the most out of F-35 system.

Flying with support systems such as E-7A Wedgetail, EA-18G Growler or the Air Warfare Destroyers in a maritime sense, ensures that the F-35 system is functioning as efficiently and effectively as possible, meaning that you are getting the most out of it.
Second Line of Defense

This therefore results in the overall mission risk being lower and chance of survival and victory, being considerably higher.

In a fourth generation world, we would always deploy a minimum of two aircraft in relatively close proximity to each other.

That was because our radars were simply not powerful enough as a single entity to cover the entire airspace.

I'd have one radar effectively looking low, the wingman's radar looking high, and we combine our data there to build the picture.

RAAF Tindal F-35 facilities in process of construction. Credit: RAAF

Basically, there'll be times where I didn't necessarily see a particular contact until I was about to employ a weapon against that contact.

The big difference now is, with F-35, I see virtually everything in the airspace.

It's positively identified as a friend, foe, or neutral, which allows me to put myself into a more advantageous position earlier on in the fight.

That's the part where people don't quite understand the true capabilities of the F-35.

I know exactly what's going on in the battlespace all of the time.

The critics will often fail to take into consideration the evolution of the threats as well, some on a very, very rapid timeline.

Basically, the development of those potential threats means that in the near future, fourth generation platforms, even four and a half generation platforms, will be effectively targeted at longer range and placed at a higher risk.

You need the capabilities of the F-35 to counter these potential threats.

If people are looking at this particular airplane in Australia's instance as simply a classic Hornet or Super Hornet replacement, then they're wrong.

This is the introduction of an entirely new system, a system that can be a catalyst for the entire Australian Defense Force to move to an entirely new level in warfighting capabilities.

Standing Up the P-8/Triton Maritime Domain Strike Enterprise in Australia: Visiting RAAF Edinburgh

During my latest visit to Australia, I had a chance to visit South Australia and RAAF Edinburgh, which is near Adelaide.

At Adelaide, the Australian Navy will be building its new submarines and at RAAF Edinburgh the Aussies are standing up the other key element of their 21st century ASW capabilities, namely, the core P-8/Triton base.

I visited RAF Lossiemouth where the Brits are standing up their P-8 base and both the Aussies and the Brits are building 21st century infrastructure to support their new fleets of aircraft.

And certainly there will be cross learning between the two air forces as both face similar and large operating areas working with the USN and other ASW partners.

Australia is a cooperative partner in the P-8, somewhat similar to an F-35 partnership so are developing capabilities from the ground up with the USN.

And because they are a cooperative partner, FMS buyers will pay a fee to both the USN and the RAAF.

At Lossiemouth I discussed the new infrastructure with key RAF officials responsible for the effort, and that interview will be published later but the key role of standing up new infrastructure to support this effort is crucial to handle the new data rich airplanes, as well as the work with allies in operating the assets.

Having visited Norway earlier this year and having discussed among other things, the coming of the P-8 and the F-35 in Norway, it is clear that what happens on the other side of the North Sea (i.e., the UK) is of keen interest to Norway.

And talking with the RAF and Royal Navy, the changes in Norway are also part of broader UK considerations when it comes to the reshaping of NATO defense capabilities in a dynamic region.

The changes on the UK side of the North Sea are experiencing the standup of a P-8 base at Lossie, which will integrate with US P-8 operations from Iceland and with those of Norway as well.

In effect, a Maritime Domain Awareness highway or belt is being constructed from the UK through to Norway.

A key challenge will be establishing ways to share data and enable rapid decision-making in a region where the Russians are modernizing forces and expanded reach into the Arctic.

What was clear from discussions at Lossie is that the infrastructure is being built from the ground up with broader considerations in mind, which I am calling, building a 21st century MDA highway.

Second Line of Defense

To the South, at Marham and Lakenheath, the UK and the US are shaping would clearly be an integrated operational capability reaching to Norway, Denmark and the Netherlands.

Flying the same ISR/C2/strike aircraft, the challenge will be similar to what will be seen in crafting the MDA highway as well – how best to share combat data in a fluid situation demanding timely and effective decision-making?

The UK is clearly a key player in shaping the way ahead on both, investing in platforms, infrastructure and training a new generation of operators and maintainers as well.

In this sense, the UK-US-Norwegian-Danish-Dutch interoperability will be a foundation for shaping 21st century security in the region.

It is as much about the US learning with the allies as the allies learning from the United States.

And at the heart of this learning process are the solid working relationships among the professional military in working towards innovative concepts of operations.

This is a work in progress that requires infrastructure, platforms, training and openness in shaping evolving working relationships.

The RAF is building capacity in its P-8 hangers for visiting aircraft such as the RAAF, the USN, or the Norwegian Air Force to train and operate from Lossiemouth.

The Australians are building a very interesting structure to support their P-8s and Tritons.

The graphic below shows the overall facility being constructed at RAAF Edinburgh.

The P-8 and Triton integrated facility being built at RAAF Edinburgh, near Adelaide in South Australia. Credit: Australian Ministry of Defence

At the heart of the enterprise is a large facility where Triton and P-8 operators have separate spaces but they are being located within a unified operations centre.

It is a walk through area, which means that cross learning between the two platforms will be highlighted.

This is especially important as the two platforms are software upgradeable and the Aussies might well wish to modify the mission systems of both platforms to meet evolving Australian requirements.

I had a chance to discuss the standup of the facility with Wing Commander Mick Durant, Officer Temporary Commanding 92 Wing, Wing Commander David Titheridge, Commanding Officer 11 Squadron and Wing Commander Gary Lewis, , Deputy Director P-8 and Triton Transition.

Question: Obviously, you are working with the USN in standing up these two platforms. Could you describe that working relationship?

Answer: We've got an incredibly tight connection with the USN at the moment.

In fact, they're doing all of our initial transition training.

So they're taking our current P-3 aviators and converting them to P-8 in Jacksonville through the VP-30 training system.

There's an enduring connection, which everybody's going to benefit from in the long run.

We are P-3 operators and you need to realize that we developed indigenously a significant set of upgrades on our AP-3Cs that are not on the US P-3Cs.

In fact, some of these upgrades provided functionality in sensors that are similar to what we have so far on the P-8.

But the operating concept of the two airplanes is very different and we are working the transition from the P-3 to the P-8 which is a networked asset both benefiting from other networks and contributing to them as well as a core operational capability and approach.

The changes that are coming are very exciting.

So we're moving from an aircraft, which we've pretty much maximized, to a new one, which is called P-8, for a reason.

This is an A model aircraft. So with an A model aircraft comes to the ability to grow.

And we're going to a new world with a starting point, which allows us to grow.

The capacity to integrate, innovate, and talk to our allies and our own services is a quantum leap in what we've had in the past and it will allow us to be able to do our roles differently.

Shaping that change is one of the key missions that we've got.

We are going to innovate and think out of the box compared to P-3 tactics and concepts of operations.

Question: You fly the Wedgetail and the P-8.

Even though the systems are different, there must be some cross learning opportunities?

Answer: There are.

Second Line of Defense

We can start with the 737 aspects of operating both aircraft and the maintenance opportunities and challenges.

And we do train the electronic system operators on the Wedgetail.

And as we stand up we can connect the simulators as well to shape a broader approach to the capabilities the three aircraft can deliver, namely Wedgetail, P-8 and Triton.

There are many opportunities regarding the synergies between the E-7A and the P-8A that we are yet to explore.

Question: With an aircraft with a broader span of capability, there is the challenge of the demand side.

What about the challenge of meeting the needs of a broader set of customers?

Answer: The MPA is a very flexible platform and has been in high demand by many customers.

That is both an opportunity and a challenge.

What it means it that is we will have to prioritize the missions and the customer base for the new systems and capabilities.

We have a large, expansive ocean that we need to patrol around Australia, a large region of interest and we have a small number of assets.

Tasking prioritization, discipline associated with that and getting that right so that we can maximize all those opportunities is key.

With the P-8, and family of systems with the Triton, we can deliver capabilities to many more customers at varying levels, ranging from the strategic to the operational tactical level.

Balancing that demand and getting it right is going to be challenging.

It's a bonus, it's a fantastic opportunity, but at the same time we can't do everything for everyone all the time.

That said, we have directed levels of capability that we will be able to meet.

Question: Let us talk about the way ahead and the advantages of being on the ground floor of the P-8 program.

How do you see those advantages?

Answer: In some ways, it is like having a two nation F-35 program.

Because we are a cooperative partner we have a stake and say in the evolution of the aircraft.

And this is particularly important because the aircraft is software upgradeable.

This allows us working with the USN to drive the innovation of the aircraft and its systems going forward.

We've been allowed to grow and develop our requirements collectively.

We think this is very far sighted by the USN as well.

I think we've got the ability to influence the USN, and the USN has had the ability to influence us in many of the ways that we do things.

We will be doing things differently going forward.

It is an interactive learning process that we are setting up and it is foundational in character.

Let's look at what we're actually generating at the moment.

We're generating generation's worth of relationship building, and networking between the communities.

We are doing that over an extended period of time.

For about three years we have been embedding people within the USN's organization.

There are friendships that are being forged, and those relationships are going to take that growth path for collaboration forward for generations to come.

When you can ring up the bloke that you did such and such with, have a conversation, and take the effort forward because of that connection.

That is a not well recognized but significant benefit through the collaborative program that we're working at the moment.

We are shaping integration from the ground up.

And we are doing so with the Australian Defence Force overall.

A number of exercises and training opportunities are designed to have all the three services integrated and working in the same complex battle space.

We're reworking the way we do business internally, let alone as a collective, or collaborative process.

It's a great opportunity with the new capabilities we've got to actually empower our forces for integration at all levels.

Question: With the focus for the past decade upon land wars, ASW skill sets have clearly atrophied for the key allied navies.

How have you dealt with this?

Answer: It is a challenge.

We've had to work hard to make sure that our skills did not atrophy to the point where we didn't have that capability.

And we've done that.

And we've done it on the AP-3C in time to move to the P-8 and take on all these new ways of doing business.

So I think we arrested that just in time, but it was a real risk that we faced as well.

Some can look at the new P-8/Triton dyad as delivering significant ISR and C2 capabilities into the battlespace and it will.

Second Line of Defense

But we cannot forget our core mission which is ASW or as you have described it Maritime Domain Awareness strike capabilities.

We're the only capability that does independent long-range maritime strike.

That's the thing we need to work hard to maintain.

We need to make sure that we meet our preparedness requirements to provide long range ASW, and ASUW and those missions are key to the way we train, and do business.

CONCLUSION: SHAPING A WAY AHEAD

The Williams Foundation has provided a crucial venue for thinking through the challenges of building a flexible, agile 21st century combat force grounded in a capability to fight and win in a high intensity combat setting. The background is a real world effort by the Australian government to recapitalize their defenses forces via the acquisition of new platforms, leveraging legacy ones and shaping an integrated force going forward.

Integration is crucial not simply because Australian forces are relatively modest; but with new equipment coming on line, capabilities such as software upgradeability in key platforms and the digital revolution provide a unique opportunity to rethink integration. Rather than pursuing after market integration or simply connecting stove piped service platforms after the fact with a bolt on network, how might integration be built from the ground up?

The approach being taken is not theological or an application of set of propositions or laws written down in a guidebook. The approach is to work greater integrative processes within and among the services, and to highlight the need to pose hypotheses along the way concerning how greater integration is achievable where appropriate and ways to achieve more effective outcomes for the development of the force.

It is a quest, which is being shaped by realigning organizations, and trying to build from the ground up among the junior officers a willingness to shape interconnectivity from the ground up. It is about building a 21st century network of operators who are empowered to find force integration solutions, again where appropriate or service specific outcomes appropriate to the different warfighting domains.

Shaping a way to conduct the quest is very difficult; but the ADF is clearly been empowered to do so by Government. Such a quest inevitably will fail and succeed along the way; but without setting this objective from the ground up, it will be difficult to change the operating concepts and the then the concepts of operations, which can drive the transformation of the force.

The United States may have Joint Forces Quarterly; the ADF has a transformation process underway. And for the United States, even when the Aussies are adopting out own platforms, they are doing so in a very different context in which force integration is set as a strategic goal, rather than the pursuit of service modernization. In effect, the Aussies are providing the experimental model, which can be quite relevant to others, including the United States.

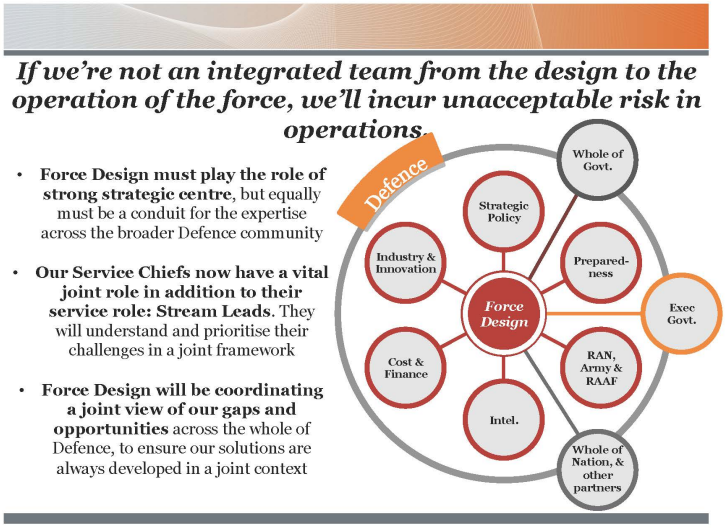
In the mid 1990s when I worked at the Institute for Defense Analyses, one of the tasks on which I worked was for the Roles and Missions Commission. One of the key tasks, which the Congress had tasked the Commission to pursue, was to determine what the United States might learn from allies. We worked hard on our white paper but when delivered to the Commission we were told by a very senior member of the Commission: "Good work; but why did you really examine the question? We are so much bigger than any of our allies, there is very little we could learn from them or apply to our own practices!"

Unfortunately, not much as changed in the attitude of many defense civilians, but many leaders in the US military do not share such views, notably with allies and the US adopting some of the same key platforms at the same time, like P-8, Triton, and the F-35, and some allies operating more advanced equipment than the US itself.

After the April 11, 2017 seminar I had a chance to discuss the challenges with Air Vice-Marshal Mel Hupfeld, Head Force Design in the Force Design Division in the Department of Defence as well as Brigadier Jason Blain, Director General Force Options and Plans, Force Design Division. The office is a joint office and the time spent was really a discussion of what the office was doing and the challenge of shaping an effective way ahead.

Indeed, the discussion for that was what it was, very much highlighted the approach which is a work in progress rather than the forced application of a set of solutions to the complex evolving organism which a modern defense organization certainly is, and one such as the ADF which is very globally engaged and learning combat lessons on the fly.

BG Blain presented at the seminar and in his presentation highlighted the focus on the force design cycle, which the office has developed to map out ways to put in place an ongoing realignment of the force structure towards more joint solutions. At the heart of the effort is a shift to a stream approach whereby functions become crucial frameworks for platform decisions, modernization decisions and future investment decisions moving forward.



Obviously this is a work in progress and perhaps always will be. The challenge is to get in place a template which allows for greater capabilities to shape force integration but in an ongoing manner; more of a directive ongoing inquiry rather than a fixed point on the compass.

Second Line of Defense

A key effort has been to align processes within the Department to maximize the possibility that a joint consideration is built into the acquisition, operational concepts and doctrinal development processes. At the same, concrete outcomes need to be demonstrated to highlight that all of this work makes a difference in terms of the deployed force as well.

The Force Design office consists of approximately 180 personnel and consists of two interactive branches. On looks at evolving futures and then works from that analysis to the development of appropriate operating concepts. The second looks at current operations and training and draws lessons learned which amounts to "harvest the best and leave the rest" moving forward.

And obviously, they tie in with other organizations, such as Defense Science and Technology, and the Defense Industry Policy Division. A key partner is the Joint Capability Management and Integration Division in the same area of the Department of Defence.

Both Divisions work together for the Vice Chief of the Defence Force (VCDF), to provide support to his role as the Joint Force Authority to ensure an Integrated Force by Design. This organization shapes the architecture for integration and interoperability for the evolving force. They work on the integrating enablers for the force, including that of C4ISR Design.

"We look at force development options and assess gaps and opportunities as we move forward. We examine as well what capabilities are not longer most useful to us. Through VCDF, who also holds authority as the Chair of the Defence Investment Committee, we then make proposals to government concerning our judgment about investment decisions from a joint perspective."

The other part of the Force Design office deals with defense preparedness and mobilization. This effort requires the office to consider the whole of the defense of Australia concept and approach. What capabilities does Australia need for integrated territorial defense?

A number of themes were highlighted in the discussion with Air Marshal Hupfeld and BG Blain.

First, shaping a cross-departmental narrative about the design of the integrated force as a guiding effort is an ongoing challenge and requirement in shaping decisions about the development of the operating force.

Second, ensuring that there is thrust forward is crucial. Concrete outcomes need to be defined and executed to ensure visible forward thrust which will in turn drive further change. How will we do rapidly in six months what the Department would normally take three to five years to do?

Third, the reshaping of operational concepts around the ongoing design of the integrated force is a key aspect of the ongoing challenge. And taking that down to the next level, namely, the concepts of operations, is crucial because a key foundation for success is empowering the younger generation of officers who are leading the force design in practice being down with the introduction of the new platforms.

"We have CONOPS for the current fight but we need to shape future CONOPS as the pull function for the design of the joint force."

Fourth, there need to be successful case studies along the way to create a demonstration effect for the Department and beyond.

In short, shaping a way ahead for the design of an integrate force is a work in progress.

But what is required is to extract modernization of the current force combined with new platforms and enablers to shape the ongoing capabilities of the ADF as an integrated force.